MEMORY IMPAIRMENT AMONG SEVERE HYPOTHYROID PATIENTS IN ENDOCRINE OPD AT GOVT.RAJAJI HOSPITAL, MADURAI.

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A dissertation submitted to

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In partial fulfillment of the requirement for the degree of

MASTER OF SCIENCE IN NURSING

OCTOBER 2018

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CERTIFICATE

This is to certify that this dissertation titled **"MEMORY IMPAIRMENT AMONG SEVERE HYPOTHYROID PATIENTS IN ENDOCRINE OPD AT GOVT.RAJAI HOSPITAL, MADURAI"** is a bonafide work done by **Mrs.S.VIJAYAPRATHA,** M.Sc. (N) Student, College of Nursing, Madurai Medical College, Madurai - 20, submitted to **THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY, CHENNAI** in partial fulfillment of the university rules and regulations towards the award of the degree of **MASTER OF SCIENCE IN NURSING, Branch V-Mental Health Nursing,** under our guidance and supervision during the academic period from 2016 -2018.

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ABSTRACT

Title: Memory impairment among severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai. **Objectives:** To assess the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at GRH Madurai. To associate the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai and their selected socio demographic and clinical variables. **Hypotheses:** There is a significant association between the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai with their selected socio demographic and clinical variables. **Methodology:** Non experimental (descriptive) research design was used, 100 severe hypothyroid patients were selected by Non-probability (consecutive) sampling and assessed through PGI memory assessment tool. **Results:** The study revealed that majority of subjects in male 15 (60.00%) and in female 42 (56.00%) had above average memory and is associated with T4 level respectively. **Conclusion:** The study finding evidenced that severe hypothyroid patients had varying level of memory impairment, females had more memory impairment comparing with male severe hypothyroid patients.

Key words: Memory impairment, severe hypothyroid patients, T4 level.

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INTRODUCTION

CHAPTER – I

INTRODUCTION

“Memories are the treasures that we keep locked deep within the storehouse of our souls, to keep our hearts warm when we are lonely.”

- Becky Aligada

The human brain is one of the most complex and interesting objects in nature. The only way we are able to survive in such a complex ever-changing world is because of our brains ability to learn and memorize things.

Many of the day to day tasks we perform depend on our ability to memorize stuff and retain important knowledge. For example, daily conversations depend heavily on the ability. It is thus extremely important for us to understand the underlying structures and mechanisms that ensure that we remember things.

The human brain is a communication system which is composed of neurons-cells which are interconnected to communicate message from one point to another in the body. Most of these messages are generated from external stimuli we daily experience. For example, sounds, light etc. As to the importance of the human brain, precisely the brain functions

To regulate internal processes which are most often involuntary such as heart beat, dilation of pupil, involuntary contraction of muscles, voluntary contraction of muscle as in smooth muscle contraction such as in the process of peristaltic movement. As an important part of the body system that enable cognitive processes like remembering, thinking. Thinking as an activity which involves many parts of our body – receptors, connectors and effectors, that is , sense organs, nerves and muscles, the

most important are the connectors- the neural mechanisms in the brain. How the brain works is an important thing to understand because we are humans in possession of a brain. Also, as important in the coordination of bodily activities so that there is a balance between the actual physiological responses and the anticipated physiological responses. For example, voluntary movement although voluntary movement we can't to take two step at a time while working other than jerk, the action is a step by step forward sequential or backward sequential movement except jerk or jump, even if we are not currently thinking about working, our part of a brain that coordinates orientation of the body in space.

In accordance with internal restoration or regulation as popularly termed 'homeostasis' is but another fact to enter into in this regard, Chemicals substances are what the minute internal variables in neurons require to proliferate to enable all this afore-mentioned processes. The same holds for hormones in the endocrine systems. The functions of both nervous system and the endocrine system undoubtedly overlap in terms of the regulation of homeostasis but much credit goes to the endocrine system.

Cognitive abilities are brain-based skills we need to carry out any task from the simplest to the most complex. They have more to do with the mechanisms of how we learn, remember, problem-solve, and pay attention, rather than with any actual knowledge. For instance, answering the telephone involves perception (hearing the ring tone), decision taking (answering or not), motor skill (lifting the receiver), language skills (talking and understanding language), social skills (interpreting tone of voice and interacting properly with another human being Cognitive abilities or skills are supported by specific neuronal networks. For instance memory skills rely mainly on parts of the temporal lobes and parts of the frontal lobes

Memory is the faculty of the mind by which information is encoded, stored, and retrieved. Memory is vital to experiences and related to limbic systems, it is the retention of information over time for the purpose of influencing future action. If we could not remember past events, we could not learn or develop language, relationships, nor personal identity (**Eysenck, 2012**). Often memory is understood as an informational processing system with explicit and implicit functioning that is made up of a sensory processor, short-term (or working) memory, and long-term memory . This can be related to the neuron. The sensory processor allows information from the outside world to be sensed in the form of chemical and physical stimuli and attended to with various levels of focus and intent.

Working memory serves as an encoding and retrieval processor. Information in the form of stimuli is encoded in accordance with explicit or implicit functions by the working memory processor. The working memory also retrieves information from previously stored material. Finally, the function of long-term memory is to store data through various categorical models or systems **(Baddely, 2007)**

Explicit and implicit functions of memory are also known as declarative and non-declarative systems **(Squire, 2009)** these systems involve the purposeful intention of memory retrieval and storage, or lack thereof. Declarative, or explicit, memory is the conscious storage and recollection of data **(Graf & Schacter, 1985).** Under declarative memory resides semantic and episodic memory. Semantic memory refers to memory that is encoded with specific meaning **(Eysenck, 2012)**, while episodic memory refers to information that is encoded along a spatial and temporal plane. Declarative memory is usually the primary process thought of when referencing memory (**Eysenck, 2012**)

Non-declarative, or implicit, memory is the unconscious storage and recollection of information **(Foerde & Poldrack, 2009**). An example of a non-

declarative process would be the unconscious learning or retrieval of information by way of procedural memory, or a priming phenomenon, priming is the process of subliminally arousing specific responses from memory and shows that not all memory is consciously activated **(Tulving & Schacter, 1990),** whereas procedural memory is the slow and gradual learning of skills that often occurs without conscious attention to learning **(Eysenck, 2012; Foerde & Poldrack, 2009).**

Memory is not a perfect processor, and is affected by many factors. The manner information is encoded, stored, and retrieved can all be corrupted. The amount of attention given new stimuli can diminish the amount of information that becomes encoded for storage **(Eysenck, 2012**). Also, the storage process can become corrupted by physical damage to areas of the brain that are associated with memory storage, such as the hippocampus **(Squire, 2009).** Finally, the retrieval of information from long-term memory can be disrupted because of decay within long-term memory **(Eysenck, 2012**). Normal functioning, decay over time, and brain damage all affect the accuracy and capacity of memory.

The thyroid gland, or simply the thyroid, is an endocrine gland in the neck, consisting of two lobes connected by an isthmus. It is found at the front of the neck, below the Adam's apple. The thyroid gland secretes thyroid hormones, which primarily influence the metabolic rate and protein synthesis. The hormones also have many other effects including those on development. The thyroid hormones triiodothyronine (T_3) and thyroxine (T_4) are created from iodine and tyrosine. The thyroid also produces the hormone calcitonin, which plays a role in calcium homeostasis.

The thyroid hormones act on nearly every cell in the body. They act to increase the basal metabolic rate, affect protein synthesis, help regulate long bone growth (synergy with growth hormone) and neural maturation, and increase the body's

sensitivity to catecholamine's (such as adrenaline) by permissiveness. The thyroid hormones are essential to proper development and differentiation of all cells of the human body. These hormones also regulate protein, fat, and carbohydrate metabolism, affecting how human cells use energetic compounds. They also stimulate vitamin metabolism. Numerous physiological and pathological stimuli influence thyroid hormone synthesis.

T_4 test and the TSH test are the two most common thyroid function tests. They're usually ordered together. The T_4 test is known as the thyroxin test. A high level of T_4 indicates an overactive thyroid (hyperthyroidism). Symptoms include anxiety, unplanned weight loss, tremors, and diarrhea. Most of the T_4 in your body is bound to protein. A small portion of T_4 is not and this is called free T_4. Free T_4 is the form that is readily available for body to use. Sometimes a free T_4 level is also checked along with the T_4 test. The TSH test measures the level of thyroid-stimulating hormone in the blood. The TSH has a normal test range between 0.4 and 4.0 milli-international units of hormone per liter of blood (mIU/L). TSH reading above 2.0 mIU/L, is a risk for progressing to hypothyroidism. T_3 test checks for levels of the hormone triiodothyronine. It's usually ordered if T_4 tests and TSH tests suggest hyperthyroidism. The T_3 test may also be ordered, signs of an overactive thyroid gland and T_4 and TSH. The normal range for the T_3 is 100–200 Nano grams of hormone per deciliter of blood (ng/dL).

Proteins, fats, and carbohydrates consumed in food are metabolized and used as materials to make body tissues and as sources of energy for the body to move. Thyroid hormones stimulate and facilitate these metabolic processes. In addition, thyroid hormones also play an important role in fetal development and child growth.

There are two types of thyroid hormones: thyroxin (T_4) and triiodothyronine (T_3). T_4 contains four iodine atoms while T_3 contains three iodine atoms. The thyroid primarily synthesizes T_4, which is then converted to T_3 in the liver. T_3 is an active hormone.

The body has a mechanism for maintaining stable thyroid hormone levels in the blood. This mechanism is controlled by thyroid-stimulating hormone (TSH) which is secreted by the pituitary gland at the base of the brain. TSH works to stimulate the thyroid and promote the secretion of thyroid hormones T_4 and T_3.

When thyroid hormones (T_4 and T_3) are in excess in the bloodstream, TSH secretion from the pituitary gland is suppressed, thereby reducing the secretion of T_4 and T_3. In contrast, when blood levels of T_4 and T_3 are low, TSH secretion increases to promote the secretion of T_4 and T_3. This feedback mechanism maintains T_4 and T_3 levels within a proper.

Hyperthyroidism occurs when the gland produces excessive amounts of thyroid hormones, the most common cause being Graves' disease, an autoimmune disorder. In contrast, hypothyroidism is a state of insufficient thyroid hormone production. Worldwide, the most common cause is iodine deficiency. Thyroid hormones are important for development, and hypothyroidism secondary to iodine deficiency remains the leading cause of preventable intellectual disability.

Hypothyroidism, also called underactive thyroid or low thyroid, is a disorder of the endocrine system in which the thyroid gland does not produce enough thyroid hormone. It can cause a number of symptoms, such as poor ability to tolerate cold, a feeling of tiredness, constipation, depression, and weight gain. Occasionally there may be swelling of the front part of the neck due to goiter. Untreated hypothyroidism

during pregnancy can lead to delays in growth and intellectual development in the baby or cretinism.

Worldwide, too little iodine in the diet is the most common cause of hypothyroidism. The most common cause of hypothyroidism is the autoimmune condition Hashimoto's thyroiditis. Less common causes include: previous treatment with radioactive iodine, injury to the hypothalamus or the anterior pituitary gland, certain medications, a lack of a functioning thyroid at birth, or previous thyroid surgery. The diagnosis of hypothyroidism, when suspected, can be confirmed with blood tests measuring thyroid-stimulating hormone (TSH) and thyroxin levels.

Salt iodization has prevented hypothyroidism in many populations. Hypothyroidism can be treated with levothyroxine. The dose is adjusted according to symptoms and normalization of the thyroxin and TSH levels. Thyroid medication is safe in pregnancy. While a certain amount of dietary iodine is important, excessive amounts can worsen certain types of hypothyroidism.

Laboratory testing of thyroid stimulating hormone levels in the blood is considered the best initial test for hypothyroidism; a second TSH level is often obtained several weeks later for confirmation. Levels may be abnormal in the context of other illnesses, and TSH testing in hospitalized people is discouraged unless thyroid dysfunction is strongly suspected. An elevated TSH level indicates that the thyroid gland is not producing enough thyroid hormone, and free T_4 levels are then often obtained. Measuring T_3 is discouraged by the assessment for hypothyroidism. There are a number of symptom rating scales for hypothyroidism; they provide a degree of objectivity but have limited use for diagnosis.

With ready access to sensitive hormone assays, the last few decades have witnessed a dramatic increase in serum thyroid function testing. This has raised many

issues about the interpretation of minor deviations in thyroid function test results, particularly in individuals with little or no conventional clinical evidence of thyroid disease.

The elderly are overrepresented among individuals with minor abnormalities in serum TSH and thyroid hormone concentration, and the clinical significance of these biochemical abnormalities in older people is the least clear. Overt hypothyroidism is well-established as a reversible cause of cognitive impairment, which may sometimes be profound. However, overt hyperthyroidism is also well known to be associated with impairment of concentration, mood changes, and alterations in perception.

A more difficult, but nonetheless important question is whether there is evidence to support a relationship between more subtle alterations in thyroid function, in particular subclinical hyperthyroidism (SH) or low serum TSH concentration and cognitive impairment.

1.1 Need for the study

Rakesh Dhadhal., (2018) conducted the study with 1904 eligible participants, the frequency of MCI was 16% in 1450 subjects with normal thyroid function, 17% in 313 subjects with clinical hypothyroidism, and 18% in 141 subjects with subclinical hypothyroidism. After adjusting for covariates (age, gender, education, education years, sex, depression, diabetes, hypertension, stroke, BMI and coronary artery disease) there is no significant association between clinical or subclinical hypothyroidism and MCI [OR 0.99 (95% CI 0.66–1.48) and OR 0.88 (95% CI 0.38–2.03) respectively]. No effect of gender interaction was seen on these effects. In stratified analysis, the odds of MCI with clinical and subclinical hypothyroidism among males was 1.02 (95%CI, 0.57–1.82) and 1.29 (95%CI 0.68–2.44), among females was 1.04 (95% 0.66–1.66) and 0.86 (95% CI 0.37–2.02) respectively.

Imaging studies provide objective evidence that brain structure and function are altered in hypothyroid patients, with decreased hippocampal volume, cerebral blood flow, and function globally and in regions that mediate attention, visuospatial processing, working memory, and motor speed. In a recent report, deficits in working memory and abnormal functional magnetic resonance imaging (MRI) were no longer present after 6 months of L-T_4 therapy, because overt hypothyroidism may present with mood or cognitive decrements, serum TSH measurement should be performed in patients with affective symptoms or impaired cognitive function.

Hypothyroidism is related to multiple cognitive deficits including working memory dysfunction, of which the underlying neural correlates were rarely studied.

In a smaller recent intervention study, **Correia *et al***. Reported that subjects with subclinical hypothyroidism had impaired spatial and verbal memory on detailed cognitive testing, which resolved after 6 months of L-T_4 therapy. However, this was an open-label, nonrandomized study where all subjects were treated. In this study, the impact of hypothyroidism on neural circuits involved in working memory processing was explored.

An alternate approach was recently reported by the laboratory. Subjects with L-T_4-treated hypothyroidism were randomized to continue their usual L-T_4 dose or to receive a lower dose to induce subclinical hypothyroidism in a crossover design with 12-wk treatment. Decrements in working (short-term) memory were seen at the end of the subclinical hypothyroidism. Note that this study was short-term and involved experimentally inducing subclinical hypothyroidism, which limits its applicability to clinical practice.

A recent study by **Zhu *et al***. Reported a neuroanatomical basis for this defect in working memory. Subclinical hypothyroid subjects had impaired working memory

and abnormal functional magnetic resonance imaging findings in frontal brain areas responsible for executive function. Some of the subclinical hypothyroid subjects were treated with L-T_4 for 6 months, at which point working memory and fMRI results normalized. This important study provides the first functional imaging corroboration of a specific deficit in working memory/executive function in subclinical hypothyroidism.

Many studies reported that hypothyroidism patients has a deficit in cognitive function and especially in memory , In India many studies performed in subclinical hypothyroidism and has the positive association between Subclinical hypothyroidism and mild cognitive impairment. So that very interested to assess the memory function among severe hypothyroidism.

1.2 Statement of the problem

A study to assess the level of memory impairment among severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai.

1.3 Objectives

1. To assess the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai.
2. To associate the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at GRH Madurai and their selected socio demographic and clinical variables.

1.4 Research hypotheses

H_1 - There is a significant association between the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai with their selected socio demographic and clinical variables.

1.5 Operational definition

Memory impairment

In this study memory impairment refers to when a person has trouble in remembering in immediate memory, recent memory, remote memory, mental balance, verbal retention, visual retention, learning new things, concentrating and recognition that affects their everyday life.

Severe hypothyroid patients

In this study severe hypothyroid patients refers to those who have TSH level >20 U/L T_4 <5.0microgram/dl, T_3<80 ng/ dl.

Endocrine OPD

In this study endocrine OPD refers to diagnosing and treating the patients suffered with hyperthyroidism, hypothyroidism and growth retardation.

1.6 Assumption

Severe hypothyroid patients have different level of Memory impairment

1.7 Delimitation

1. The data collection period is 4 to 6 weeks
2. This study is limited to endocrine OPD at Govt. Rajaji Hospital, Madurai.

1.8 Projected outcome

The study shows the level of memory impairment among severe hypothyroid patients at Govt. Rajaji Hospital, Madurai.

REVIEW OF LITERATURE

CHAPTER – II

REVIEW OF LITERATURE

Researchers generally undertake a literature search to familiarize themselves with a knowledge base. A review of related literature is an integrate component of any scientific approach. It involves a systematic identification, location, scrutiny and summary of written materials that contain information on a research problem.

A review of literature helps to assess what is already known, what is still unknown and untested, justify the need for its replication throw some light on the feasibility of the study and problems that may be encountered. It also helps to involve promising methodological tools, which sheds light on ways to improve the efficiency of data collection and obtain useful information on how to increase the effectiveness of data analysis.

The overall process of review of literature is to develop a strong knowledge base to carry out research and other scholarly educational and clinical practice activities. It helps to determine the gaps consistencies and inconsistencies in the literature about the particular subject under study.

The related literature is reviewed from the published and unpublished articles and Medline and internet search to broaden the understanding and insight in to the selected problem under the study. This review of literature is a broad overview of studies, which are organized chronologically and arranged under the following sections.

The literature was searched from extensive review from various sources was depicted under the following heading.

I. Review of literature related to prevalence of hypothyroidism

II. Review of literature related to memory impairment on hypothyroidism

2.1 Literature related to prevalence of hypothyroidism

Sanjay Kalra., (2018) conducted a study on Prevalence of hypothyroidism in adults.An epidemiological study in eight cities of India Chennai, Delhi, Goa, Ahmedabad, Hyderabad, Kolkata and Mumbai. These cities were selected to ensure participation of a diverse study population with respect to geographic origin, occupation, socioeconomic status and food habits. Primary outcome measure of the study was the prevalence of hypothyroidism assessed by measurement of thyroid hormones. Secondary outcome measures were the prevalence of: i) self-reported and undetected hypothyroidism, ii) sub-clinical hypothyroidism (SCH) and iii) anti-thyroid peroxidase (TPO) antibody positivity in the study population. All male or female natives (residing in that area for at least 5 years) aged ≥18 years, were invited to participate in a general health checkup camp, A total of 36 (0.67%, 95% CI, 0.45-0.89) participants including 21 females (0.72%) were diagnosed with hyperthyroidism. There was no association ($P > 0.05$) between hyperthyroidism and age or gender. Subclinical hyperthyroidism was seen in 68 (1.27%, 95% CI, 0.96-1.56) patients.

Chaudhary M Thakral and Kalra S., (2018) identify the prevalence of hypothyroidism in term pregnancies by retrospective review of results from April 2016 to March 2017 which were booked patients at a maternity center in Karnal, Haryana, North India. Assessed thyroid-stimulating hormone (TSH) during pregnancy with the help of chime luminescence assays and it was interpreted with thyroid association recommended to trimester specific cut off among 569 records, Of the 569 women included 4.2% (n = 24) were illiterate, 7.0% (n = 40) had not completed matriculation, 16.0% (n = 91%) were 10th pass, 30.6% (n = 174) were graduates, and 41.7% (n = 237) were postgraduates. The mean age was 27.33 ± 3.78 years. A total of 42.8% (n = 243)

were primi gravida, 27.8% (*n* = 158) were second gravida, 16.0% (*n* = 91) were third gravida, and 13.4% were grand multipara. Parity was one in 215/326 (%) (*n* = 215) and two in 48/326 (%) (*n* = 48) of the multigravida expectant mothers. History of one pregnancy loss was reported in 19.7% (*n* = 112), two losses in 8.4% (*n* = 48), and three or more losses in accordingly, 2.9% (*n* = 16) women. Of the 569 women, 59.1% (*n* = 336) delivered vaginally. While 40.9% (*n* = 233) underwent cesarian section, the vast majority (93.8%; *n* = 534) had cephalic presentation, with 6.2% (*n* = 35) exhibiting breech presentation. A total of 52.9% (*n* = 301) delivered singleton boys, 46.0% (*n* = 262) delivered singleton daughters, while 1.1% (*n* = 6) mother had twins. Two deliveries ended in still birth. Of all these participants, 12.3% (*n* = 70) were being treated for hypothyroidism. Eleven patients (15.7%) were diagnosed to have hypothyroidism during pregnancy, while 59 (84.3%) had been on treatment before conception. Their last recorded mean TSH was 4.48 ± 5.064 μIU/ml, and the dose of thyroxine varied from 25 to 200 μg (mean 76.38 ± 43.02 μg). One patient was a diagnosed case of hyperthyroidism.

Punitha K., (2017) conducted the study on prevalence of hypothyroidism (clinical/ subclinical) among type II diabetes mellitus with or without history of hypothyroidism about 3 years duration, and correlation of HbA1C levels with TSH levels in Chennai, from February 2014 to September 2014 of OPD and inpatients. The newly diagnosed patients of hypothyroidism in diabetes were treated with thyroxin for three months and followed up with TSH and HBa1c levels. Diabetes Mellitus and hypothyroidism are very closely related to each other and both are associated with several metabolic abnormalities. There are many common features in both these endocrine disorders. The normalization of TSH levels leads to a reduction in postprandial glucose levels, CRP, HbA1c and lipids. This indicates a significant effect of treatment with L-thyroxine on glycemic control in patients with subclinical

hypothyroidism. Determination of TSH is accurate, accessible, safe and inexpensive test to diagnose subclinical hypothyroidism. Determining the level of TSH can be used to define the risk of the occurrence of various complications (osteoporosis, cardiovascular disease, depression) for different intervals between TSH. Subclinical hypothyroidism is quite hard to diagnose. In practice this is often overlooked. Adequate diagnosis requires conducting extensive laboratory tests other than routine as the TSH test. Monitoring of body temperature and careful monitoring of clinical signs, then well taken case history helps to faster and easier detection of this disease in medical practice. My study revealed a strong correlation between duration of diabetes and hypothyroidism, FBS values and hypothyroidism.Hba1c before and after thyroxin, TSH before and after thyroxin also revealed a strong correlation ($p<.05$).The main part of my study which revealed a strong correlation between Hba1c and TSH levels. As per the previous studies (as in citations) and my study, I can conclude that there was high prevalence of hypothyroidism in diabetes mellitus and there was correlation between Hba1c and TSH levels. More studies with similar indices have to be performed to confirm the study results. I can also conclude that doing a TSH levels in patients of diabetes mellitus is warranted.

Gaurav Agarwal sudhakar mk el al., (2016) conducted the study and found the prevalence of thyroid dysfunction among South Indian women with Metabolic Syndrome at tertiary care teaching hospital in Chennai city, South India, for 76 women. Fasting blood samples were obtained from the subjects and glucose, total cholesterol, high density lipoprotein (HDL), low density lipo protein (LDL) and triglyceride levels were estimated. The serum thyroid stimulating hormone and free thyroxin levels were also measured. Of the seventy six patients 53% had subclinical hypothyroidism, 25% had overt hypothyroidism and 22% were euthyroid. Overt hyperthyroidism was not present in any of the patients. The mean age of the study group was 52.68, with a

standard deviation of 10.20. Women in the 40-60 year age group had a higher incidence of thyroid dysfunction as compared to those in the other age groups. Our study indicates the higher prevalence of thyroid hypo function in South Indian women with metabolic syndrome and thus it necessitates the need for evaluating the thyroid status in women with metabolic syndrome.

Kumaravel Velayutham and Sivan Arul Selvan., (2015) identify the Prevalence of thyroid dysfunction among young females in a South Indian population. This study was conducted in female college students in seven colleges in Madurai District, Tamil Nadu. Thyroid-stimulating hormone (TSH) was used as the screening test to diagnose thyroid dysfunction. The abnormal TSH values were classified as mild TSH elevation (TSH 4.5–10 mIU/ml), significant TSH elevation (TSH > 10 mIU/ml), and low TSH (TSH < 0.4 mIU/ml).

A total of 1292 subjects were screened of whom 161 subjects (12.5%) had abnormal TSH. The overall prevalence of elevated TSH was 11% out of which 9.7% had mild TSH elevation. A low TSH was seen in 1.3% of the study population. Thyroid dysfunction was common in young women in south India. One out of every eight young women had thyroid dysfunction, and mild TSH elevation was the most common abnormality.

Senthilkumaran1 V Sathyaprakash., (2015) conducted a cross sectional study on Prevalence and Distribution of Subclinical Hypothyroidism in rural women attending Chennai Medical College Hospital and Research Centre, Tiruchirappalli, Tamilnadu, India. More than 12 years of age group including adolescent, pregnant, older age groups are selected and investigated for subclinical hypothyroid by doing FT_3, FT_4 and TSH concentrations. Thyroid function tests are done in Clinical biochemistry Department by Enzyme Linked Immuno Sorbident Assay. Total number of 417 patients enrolled this study, 37(9%) patients were found to diagnose as subclinical

hypothyroidism, 32(8%) patients were found to be hypothyroid patients. The mean value of Subclinical hypothyroid Group were FT_3 137.23±40.35, FT_4 7.3 ± 51.65, TSH 9.26±3.06. Hypothyroid group were FT_3 51.98±16.60, FT_4 3.76±1.38, TSH 18.86±11.36, Euthyroid group were FT_3 131.74±8.33, FT_4 7.64±0.13, TSH 2.63±0.14, There is an increase in distribution of number of cases of subclinical hypothyroidism as the age advances from 15 years to 67 years. (15-25 years n=2, 26-35 years n=4, 36-45 years n=6, 46- 55years n=11, 55-67 years n=14). The present study has identified that the prevalence of subclinical hypothyroidism in females is found to be 9%, which is more when compared to frank hypothyroidism and the pattern of distribution of subclinical hypothyroidism increases as the age advances.

Rakesh Dhadhal., (2015) conducted a study on a cross sectional study of prevalence of hypothyroidism in adult population of Udaipur district patients referred to central lab in Geetanjali Medical College & Hospital, Udaipur, Rajasthan. Thyroid abnormalities were diagnosed on the basis of thyroid function test results (serum T_3, T_4 and TSH levels). Patients with history of hypothyroidism or those with serum T_4 5.50 µU/ml, were categorized as hypothyroid. The prevalence of subclinical hypothyroidism and anti-thyroid peroxidase (anti-TPO) antibody positivity was also assessed. A total of 300 adult patients ≥20 years of age were evaluated (mean age: 41 years; 88% females). The overall prevalence of hypothyroidism was 9.33% (n=28) of which 5.66% (n=17) patients self-reported the condition, whereas 3.67% (n=11) were previously undetected. A significantly higher proportion of females (89.28%) vs. males were diagnosed with hypothyroidism. Additionally, 4% (n=12) patients were diagnosed to have subclinical hypothyroidism (normal serum T_4 and TSH>5.50 µIU/ml). Anti–TPO antibodies suggesting autoimmunity were detected in 56 patients (18.66%). The prevalence of hypothyroidism was common, affecting approximately one in 11persons in present study. Female patients and middle aged adults had significant association

with hypothyroidism. Subclinical hypothyroidism and anti-TPO antibody positivity were the other common observations.

Ane Garmendia Madariaga., et al (2014) conducted the study on Incidence and Prevalence of Thyroid Dysfunction in Europe A Meta-Analysis, The National Health and Nutrition Examination Survey III provided a reference for the frequency of thyroid dysfunction in the United States. Unknown hypothyroidism and hyperthyroidism were found in 4.6% and 1.3% of the American sample, respectively, Comparing these results with present meta-analysis results, the Europeans exceed the Americans by 0.34% for unknown hypothyroidism and by 0.42% for unknown hyperthyroidism. Only 6.5% of the unknown hypothyroidism was overt in the U.S. population, whereas 38.5% of unknown hyperthyroidism, whereas 38.5% of the unknown hyperthyroidism was overt in the same sample.

Ambika Gopalakrishnan Unnikrishnan et.al (2013) Conducted the study to determine the Prevalence of hypothyroidism in adults: An epidemiological study in eight cities of India A cross-sectional, multi-Centre, epidemiological study was conducted in eight major cities (Bangalore, Chennai, Delhi, Goa, Mumbai, Hyderabad, Ahmedabad and Kolkata) of India to study the prevalence of hypothyroidism among adult population. Thyroid abnormalities were diagnosed on the basis of laboratory results (serum FT_3, FT_4 and Thyroid Stimulating Hormone [TSH]). Patients with history of hypothyroidism and receiving levothyroxine therapy or those with serum free T_4 <0.89 ng/dl and TSH >5.50 μU/ml, were categorized as hypothyroid. The prevalence of self-reported and undetected hypothyroidism, and anti-thyroid peroxidase (anti-TPO) antibody positivity was assessed. A total of 5376 adult male or non-pregnant female participants ≥18 years of age were enrolled, of which 5360 (mean age: 46 ± 14.68 years; 53.70% females) were evaluated. The overall prevalence of hypothyroidism was 10.95% (n = 587, 95% CI, 10.11-11.78) of which 7.48% (n = 401)

patients self-reported the condition, whereas 3.47% (n = 186) were previously undetected. Inland cities showed a higher prevalence of hypothyroidism as compared to coastal cities. A significantly higher ($P < 0.05$) proportion of females vs. males (15.86% vs 5.02%) and older vs. younger (13.11% vs 7.53%), adults 1 2 3 4

Mark P. J. Vander pump, (2011) the epidemiological study of thyroid disease the prevalence of goitre in areas of severe iodine deficiency can be as high as 80%. Populations at particular risk tend to be remote and live in mountainous areas in South-East Asia. The prevalence of goiter in areas of severe iodine deficiency can be as high as 80%. Populations at particular risk tend to be remote and live in mountainous areas in South-East Asia there is an inverse relationship between age at10-20 diagnosis and intelligence quotient in later life. In iodine-replete areas, 85% of the cases are due to sporadic developmental defects of the thyroid gland (thyroid dysgenesis), such as the arrested migration of the embryonic thyroid (ectopic thyroid) or a complete absence of thyroid tissue (athyreosis). The remaining 15% have thyroid dyshormono genesis defects transmitted by an autosomal recessive mode of inheritance. A daily iodine intake <25 μg, particularly in preterm infants, accounts for many cases in Europe, Asia and Africa. Clinical diagnosis occurs in <5% of newborns with hypothyroidism because symptoms and signs are often minimal. As a result, it is not possible to predict which infants are likely to be affected. Without prompt diagnosis and treatment most affected children gradually develop growth failure, irreversible mental retardation and a variety of neuropsychological deficits.

2.2 Literature related to memory impairment on hypothyroidism

Dr. Lakshmi Rajesh., (2017) compare the cognitive dysfunctions in patients with thyroid disorders such as hypothyroidism, hyperthyroidism and subclinical thyroid states. A Purposive sampling was undertaken from the outpatient department of Endocrinology, Narayana Medical College & Hospital, Nellore, and Andhra Pradesh.

The study included the patients with thyroid disorders and Normal healthy controls. The sample of the study comprised of 60 participants. Out of this 60 participants 30 were diagnosed with thyroid disorders and 30 volunteers who accompanied with patients without evidence of any thyroid disorders who were willing to participate in the study were selected as controls. The mean SMMSE scores among the cases was 19.4 (± 4.65) and among the controls was 28.1 (± 1.67). The DSST scoring of the cases and controls had shown that the mean 68.1 (± 19.4) and controls was 95.3 (± 3.94). The mean (± SD) TMT - A scores of the cases was 25.8 (± 6.23) and controls was 20.5 (± 2.58). The mean TMT – B scores of the cases was 114.8 (± 51.03) and controls was 68.9 (± 19.2).The means of SMMSE, DSST, TMT – A, TMT – B scores have shown statistically significant difference between the patients with thyroid disorders and normal healthy controls.

Dr.Gomathi Siva Kumar, (2016) conducted the study to evaluate the cognitive function in subclinical hypothyroidism**.** Thyroid hormones are necessary for normal cognitive function. Overt Hypothyroidism is a common cause for reversible dementia. There is evidence to suggest that even subclinical hypothyroidism (normal T_3 & T_4 and high TSH) is associated with cognitive impairment. The purpose of our study is to assess the cognitive function in subclinical hypothyroid patients by Mini-Mental State Examination and P300 wave recording. Method: Thirty newly diagnosed subclinical hypothyroid females of age group 25 to 40 years were selected from the patients attending Endocrinology OPD, Government General Hospital, and Chennai – 3. Age matched euthyroid females were taken as controls. Mini-Mental State Examination (MMSE) was done for both groups. The P300 wave was recorded at Cz and Pz using a computerized evoked potential recorder .The latency of P300 wave and P300 amplitude were analyzed using independent-t-test. p-value <0.05 was considered significant Results: There was no statistically significant difference in the MMSE scores between

cases and controls. There was no statistically significant change in P300 amplitude at Cz and Pz. But there was a a very significant prolongation of P300 wave latency at Cz and Pz in subclinical hypothyroid group when compared to the control groupa measure of cognitive efficiency was significantly prolonged, showing impaired cognitive processing in subclinical hypothyroidism.

Giuseppe Pasqualetti., (2015) conducted the meta analysis of association between subclinical hypothyroidism Subclinical hypothyroidism and Cognitive Impairment Systematic Review and Meta-Analysis ,the association between subclinical hypothyroidism and cognitive impairment The aim of this systematic review and meta-analysis was to evaluate the possible effect of Subclinical hypothyroidism on cognitive decline and the risk of dementia. Cognitive function was the primary outcome, evaluated as composite end point of incidence or prevalence of dementia or difference of Mini Mental State Examination, Wechsler Adult Intelligence Scale, and Wechsler Memory Scale-Revised scores was observed thirteen studies were included in the meta-analysis. A significant risk of cognitive alteration was observed only in subclinical hypothyroidism individuals younger than age 75 years, composite endpoint odds ratio (OR) 1.56 (95% confidence interval [CI] 1.07–2.27, *P*.02, I2 82.5%), risk of dementia OR 1.81 (95% CI 1.43–2.28, *P* = .01, I2 - 35%). Mean serum thyroid-stimulating hormone (TSH) levels and the OR of composite endpoint were positively correlated. No significant effect of sub clinical hypothyroidism was found when considering all the studies as a whole: composite endpoint OR 1.26 (95% CI 0.96–1.66, *P* = .09, I2 - 87.2%), risk of dementia OR 1.42 (95% CI, 0.97–2.07, *P* = .07, I2 - 66.8%), Mini Mental State Examination mean difference 0.059 (95% CI - 0.464 to 0.346 *P* = .78, I2 - 51.8%). This meta-analysis demonstrates a relationship between subclinical hypothyroidism and cognitive impairment only in individuals younger than 75 years of

age and those with higher TSH concentrations. No correlation was found while considering all the studies as a whole.

A R Somashekar., (2014) conducted the study on correlation of Cognitive Performance and Thyroid Hormone Levels in Adolescents with Subclinical Hypothyroidism. Subclinical hypothyroidism (SCH) can negatively affect cognitive functioning. This study aimed at correlating serum T_3, T_4, TSH with adolescent's performance on a learning disability scale. A cross-sectional study was conducted on 100 school children, (10 - 15 years). Thyroid hormones were estimated and classified into two groups such as euthyroid and subclinical hypothyroid. NIMHANS index for Specific Learning Disabilities was used to assess the learning ability and cognitive functions. Subclinical hypothyroid group made more mistakes than euthyroid group. In SCH male group, T_3 correlated with language and T_4 levels correlated in all areas except in language. In the females, there is no significant correlation between T_3 and ability parameters except in partial correlation co efficient among euthyroid children in arithmetic, visual-motor skills and memory. T_4 results did not correlate in language skills. There was a statistical significance between T_4 and ability skills in girls except in language. TSH and language skills correlated in females. Conclusion: T_3 and T_4 levels have correlation with cognitive skills other than TSH. It is necessary to measure both T_3 and T_4 in addition to TSH in adolescents.

Earn Gan and Simon H S., (2012) conducted the study on Cognitive Function and Low Thyrotropin in Older People. Several studies have reported an association between low serum TSH, or subclinical hyperthyroidism (SH), and dementia, but little emphasis has been placed on this field because not all studies have demonstrated the same association. Weper formed a detailed systematic review to assess the evidence available to support the association between these two conditions. They performed a systematic search through the PubMed, Embase (1996 to 2012 wk 4), Cochrane

Library, and Medline (1996 to January wk 4, 2012) electronic databases using key search terms encompassing subclinical hyperthyroidism, TSH, dementia, and cognitive impairment. This review examines the 23 studies that provide information about the association between SH or lower serum TSH within the reference range and cognition. Fourteen of these studies, including several well-designed and well-powered cross-sectional and longitudinal analyses, have shown a consistent finding of an association between SH with cognitive impairment or dementia. There is a substantial body of evidence to support the association between SH and cognitive impairment, but there is no clear mechanistic explanation for these associations. Nor is there an indication that anti thyroid treatment might ameliorate dementia.

Renate T de Jongh et al., (2011) identified the Endogenous subclinical thyroid disorders, physical and cognitive function, depression, and mortality in older individuals. To what extent endogenous subclinical thyroid disorders contribute to impaired physical and cognitive function, depression, and mortality in older individuals remains a matter of debate. A population-based, prospective cohort of the Longitudinal Aging Study, Amsterdam. TSH and, if necessary, thyroxine and triiodothyronine levels were measured in individuals aged 65 years or older. Participants were classified according to clinical categories of thyroid function. Participants with overt thyroid disease or use of thyroid medication were excluded, leaving 1219 participants for analyses. Outcome measures were physical and cognitive function, depressive symptoms (cross-sectional), and mortality (longitudinal) Sixty-four (5.3%) individuals had subclinical hypothyroidism and 34 (2.8%) individuals had subclinical hyperthyroidism. Compared with euthyroidism, subclinical hypo and hyperthyroidism were not significantly associated with impairment of physical or cognitive function, or depression. On the contrary, participants with subclinical hypothyroidism did less often report more than one activity limitation (odds ratio 0.44, 95% confidence interval (CI)

0.22–0.86). After a median follow-up of 10.7 years, 601 participants were deceased. Subclinical hypo- and hyperthyroidism were not associated with increased overall mortality risk (hazard ratio 0.89, 95% CI 0.59–1.35 and 0.69, 95% CI 0.40–1.20 respectively).

This study does not support disadvantageous effects of subclinical thyroid disorders

Karolina Jabłkowska et al., (2009) Working memory and executive functions in hyperthyroid patients with Graves' disease Assessment of working memory and executive dysfunctions, as well as the intensity of depressive symptoms in hyperthyroid patients with Graves' disease, compared to healthy subjects. Thirty (30) patients with Graves' disease (20 female, 10 male), aged 18-55, participated in the study. The control group consisted of 31 healthy subjects, matched by age, gender and educational level with patients in the examined group. The assessment of working memory and executive functions was estimated by the Wisconsin Card Sorting Test and the N-back test. The intensity of depressive

Symptoms was assessed by Beck Depression Inventory Significant disturbances of working memory and executive functions were noted in hyperthyroid patients with Graves' disease in comparison to healthy subjects. Longer disease duration was associated with worse results in psychological tests, while higher educational level of the patient resulted in better test outcomes. In the group of patients with Graves' disease, 1/3rd of them presented with significant intensity of depression symptoms; additionally, the intensity of depression symptoms correlated with cognitive function impairments in the whole group of examined patients.

Dr. Elizabeth Barrett., (2009) evaluate the association of thyroid stimulating hormone levels with cognitive function and depressed mood in a community-based sample, a Cross-sectional study conducted at Clinic visit in 1999- 2003, were

participated Community-dwelling men (N=447) and women (N=663) aged 42-99 years. Cognitive function was assessed with the Buschke-Fuld Selective Reminding Test, the Modified Mini-Mental State Examination, Trails B, and category fluency. Depressed mood was assessed with the Beck Depression Inventory (BDI). A fasting blood sample was obtained for thyroid stimulating hormone (TSH) measurement. Mean age was 73.6±10.0 in men and 74.3±10.4 in women. Mean TSH was 1.9 μIU/ml in both sexes; 9.0% of men and 24% of women reported thyroid medication use. Mean BDI scores were 4.6±4.1 in men and 5.2±4.3 in women; 9% of men and 11% of women used antidepressants. Before and after adjustment for covariates or exclusion of participants taking thyroid hormones, no associations were observed between TSH and cognitive function (ps>0.10). TSH was inversely associated with BDI (p=0.03) in men, but not women. Thyroid stimulating hormone level was unrelated to cognitive function in men and women, and was inversely associated with depressed mood in men only, possibly reflecting the greater use of both thyroid medications and antidepressants by women.

Karen J Miller Ph.D., (2007). Verbal Memory Retrieval Deficits Associated with Untreated hypothyroidism recent research has focused on specifying the memory deficits associated with hypothyroidism. Studies have found that patients with biochemical evidence of untreated hypothyroidism exhibit a specific memory retrieval deficit for verbally presented material. **Jaeschke** reported a significant improvement in verbal memory with levothyroxine treatment for their 18 participants, using a memory composite of contextual and associative memory tasks. Processing speed did not improve with treatment. **Burmeister et al** found that discontinuing thyroid hormone treatment for 13 thyroid cancer patients led to specific verbal memory retrieval deficits as demonstrated with a learning task.

2.3 Conceptual framework

A conceptual framework is a group of concepts and a set of propositions that make scientific findings spell out the relationship between them. The overall purpose is to make scientific findings meaningful and generalizable. Concepts are the mental images of phenomena and they are the building blocks of the theory.

Conceptual framework refers to interrelated concepts or abstractions that are assembled together in some rational scheme by virtue of their relevance to a common thing. This is a device that helps to stimulate research and is the extension of knowledge by providing both direction and impetus.

- Polit and Hungler

The present study is aimed at assessing the level of memory impairment among severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai. The conceptual frame work for the present study was based on Modified Shiffman's Interactive Models of Factors leading to outcomes in health.

The model is comprised of four primary components.

- Network
- Environment
- Issue characteristics
- Outcome

The first three factors are interdependent and interact with each other to provide outcome. Each factor has its own sub elements contributing to their effectiveness in producing outcome.

Network

Network is people working together in the health team in order to achieve the health of the patients.

In this study network refers to health care provider identify the memory impairment among severe hypothyroid patients, in the way of diagnosing and treating the patients in a comprehensive manner.

Environment

Environment refers to the complex of physical, chemical and biotic factors (such as climate soil, and living things) that acts upon organism or an ecological community and ultimately determine its form and survival, the aggregate of social and cultural conditions that influence the life of an individual or community.

In this study environment refers to hypothyroid patients accept their problems in memory and followed the guide lines given by the researcher, to improve their memory or opposition to care given by the health team members, it is based on to internal and external environment such as

Internal environment

- Underactive thyroid (Increased TSH and reduced level of thyroxin)
- Low level thyroxin prevents the energy consuming process needed for neurotransmission leading cognitive impairment especially memory.

External environment

- Family role strain.
- Digitalized technological advancement.
- Needs to be smarter in the growing world.

Issue Characteristics

Issue characteristics refers to individuals affected with problem, severity of the illness and tractability of affected people.

In this study affected people is a severe hypothyroid patients and their severity of illness is the memory impairment, tractability is the way of hypothyroid patients cope up or managing the memory impairment by following the education given by the researcher to improve the attention, concentration, immediate memory, recent memory, remote memory, visual recalling, verbal recalling and recognition.

Outcome

Outcome is the knowledge, intervention, mortality or morbidity of illness.

In this study outcome refers to knowledge of the researcher about the memory impairment among severe hypothyroid patients, based on this the researcher plan the nursing intervention, such as name and number recalling, dairy writing, scheduling of the day to day activities (Memory training).

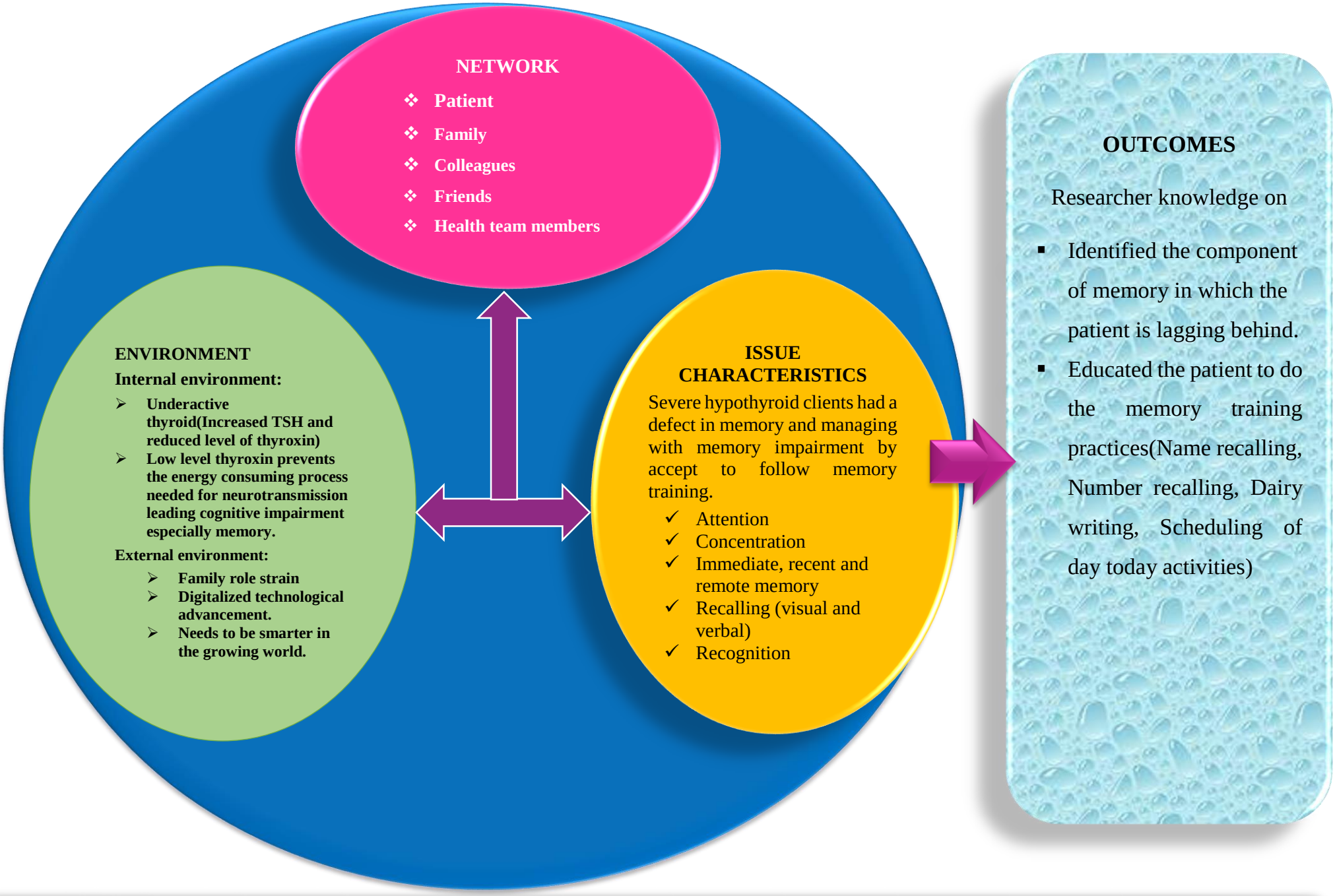


Figure 1: Conceptual frame work based on Shiffman's interactive model of factors leading to outcomes in health (2013)

RESEARCH METHODOLOGY

CHAPTER - III

RESEARCH METHODOLOGY

The methodology of research indicates the general pattern of developing or refining the methods of obtaining, organizing or analyzing data for gathering valid and reliable data for investigation. This chapter includes research design, setting of the study, population, sample, and inclusion and exclusion criteria for selection of sample, development and description of the tool, content validity, pilot study, data collection procedure and plan for data analysis.

3.1 Research approach

The research approach is the most essential part of any research. The entire study is based on it. In this study to assess the levels of memory impairment among hypothyroid patients is assessed. Therefore a quantitative evaluative approach was used.

3.2 Research design

Non experimental (descriptive) research design.

3.3 Research variables

Level of memory impairment

3.4 Setting of the study

The study was conducted in endocrine OPD at Government Rajaji Hospital Madurai. It is the second biggest Government medical college hospital in Tamilnadu. It has all specialty departments and it is one of the separate endocrinology department to serving the people of south Tamilnadu. The hospital is equipped with bed strength 3106 beds. Average of 3700 old patients and 300 new patients were attended the endocrine OPD.

3.5 Population of the study

Target population

The study population comprised of severe hypothyroid patients

Accessible population

The study population comprised of severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai.

3.6 Sample

Severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai and those who fulfilled the inclusion criteria.

3.7 Sample size

The sample size comprised of 100 severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai.

3.8 Sampling technique

Non probability (consecutive) sampling technique was used in this study.

3.9 Criteria for sample selection

The study sample was selected by the following inclusion and exclusion criteria.

Inclusion Criteria

- Who is having TSH level above 20 ml U/L, T_4<5.0 microgram/dl

  T_3<80 ng/dl

- Male and female between the age group of 20-45 years.

Exclusion Criteria

- Subjects who is having other medical or mental illness
- Sample who is consuming alcohol or cannabis.
- Hypothyroid patients who is suffered with brain infection.

3.10 Research tool and technique

- PGI (Post Graduate Institute) memory assessment tool.
- The technique used for the study was structured interview method.

The tool consists of three sections.

Section I: Socio Demographic variables.

Section II: Clinical variable

Section III: PGI memory assessment scale

Section I: (**Socio Demographic variables)**

It consisted of socio demographic variables of the hypothyroid patients such as age, gender, and area of residence, religion, education, occupation, family income per month, marital status, Food habits, and duration of illness.

Section II: (**clinical variables)**

Including TSH level above 20 ml/U/L

T_4 level <5.0 microgram/ dl

T_3 level <80 ng/dl

Section III

The PGI memory assessment tool was designed as a brief structured questionnaire regarding memory components, immediate memory, remote memory, recent memory, mental balance, Attention and concentration, delayed verbal recall, immediate recall, verbal retention of similar pairs, verbal retention of dissimilar pairs, visual retention, recognition.

3.11 Scoring procedure

Section I: No scoring was given for the socio - demographic variables of the hypothyroid patients

Section II: No scoring was given for the selected clinical variable of TSH, T_3, T_4. The questions was administered to ascertain the memory functioning score According to the answers, of hypothyroid patients related to memory functioning.

80-100	**–**	**Excellent**
60-80	**-**	**Above average**
40-60	**-**	**Average**
20-40	**-**	**Below average**
0-20	**-**	**Low level memory**

3.12 Testing of the tool

Validity of the tool

In order to measure the content validity, the questionnaire was given to 5 experts in the field of Psychiatric Nursing, Psychiatrist, Psychologist and Statistician. They were requested to judge the items for clarity, relatedness, meaningfulness and adequacy of the contents. Tool was translated in to Tamil and retranslated to English to confirm meaning of the tool.

Reliability of the tool

The reliability of a measuring instrument is a major criterion for assessing its quality and adequacy. Reliability is the consistency with which it measures the target attribute. The reliability of the tool was done by test retest reliability method r- value was 0.86.Hence the tool was reliable and was used in this study.

3.13 Pilot study

A pilot was conducted in Endocrine OPD at Govt. Rajaji Hospital, Madurai to test the feasibility, relevance and practicability of the tool. Prior data collection, ethical clearance was obtained from ethical committee and formal permission was obtained from the professor and Head Of the Department, department of Endocrinology, Govt.

Rajaji Hospital, In endocrine outpatient department 200 patients attended OP per day 5000- 6000 patients attended per month.10 subjects were selected by non-probability (consecutive) sampling technique. Brief introduction was given about self to the subjects and established rapport. Written and verbal informed consent was obtained all the study participants. Data was collected from 21.5.2018 to 27.5.2018. The finding of the study revealed that the tool was feasible and practicable.

3.14 Data collection procedure

The data collection was done in endocrine OPD at GRH, Madurai. Prior to data collection Ethical Clearance was obtained from the ethical committee of Govt. Rajaji Hospital, Madurai and from the departmental head of Endocrinology to conduct the study. Both verbal and written informed consent was obtained from all the study participants. Data collection was done for six weeks from 4.6.18 to 13.7.18 at endocrine OPD.

Session started with introduction of self, establishment of rapport, comfortable seat arrangement and explanation given regarding the purpose and nature of the study and the benefits of participating in it. Approximately 100 patients selected by non-probability (consecutive) sampling and assess through PGI memory assessment scale for the hypothyroid patients.

3.15 Plan for data analysis

The data analysis involved the translation of information collected during the course of research project into an interpretable and managerial form. It involved the use of statistical procedures to give an organization and meaning to the data. To compute the data, a master sheet was prepared by the investigator. Descriptive and Inferential statistics used for data analysis.

Descriptive statistics

Frequency and percentage was used for analyzing socio demographic and clinical variables of severe hypothyroid patients.

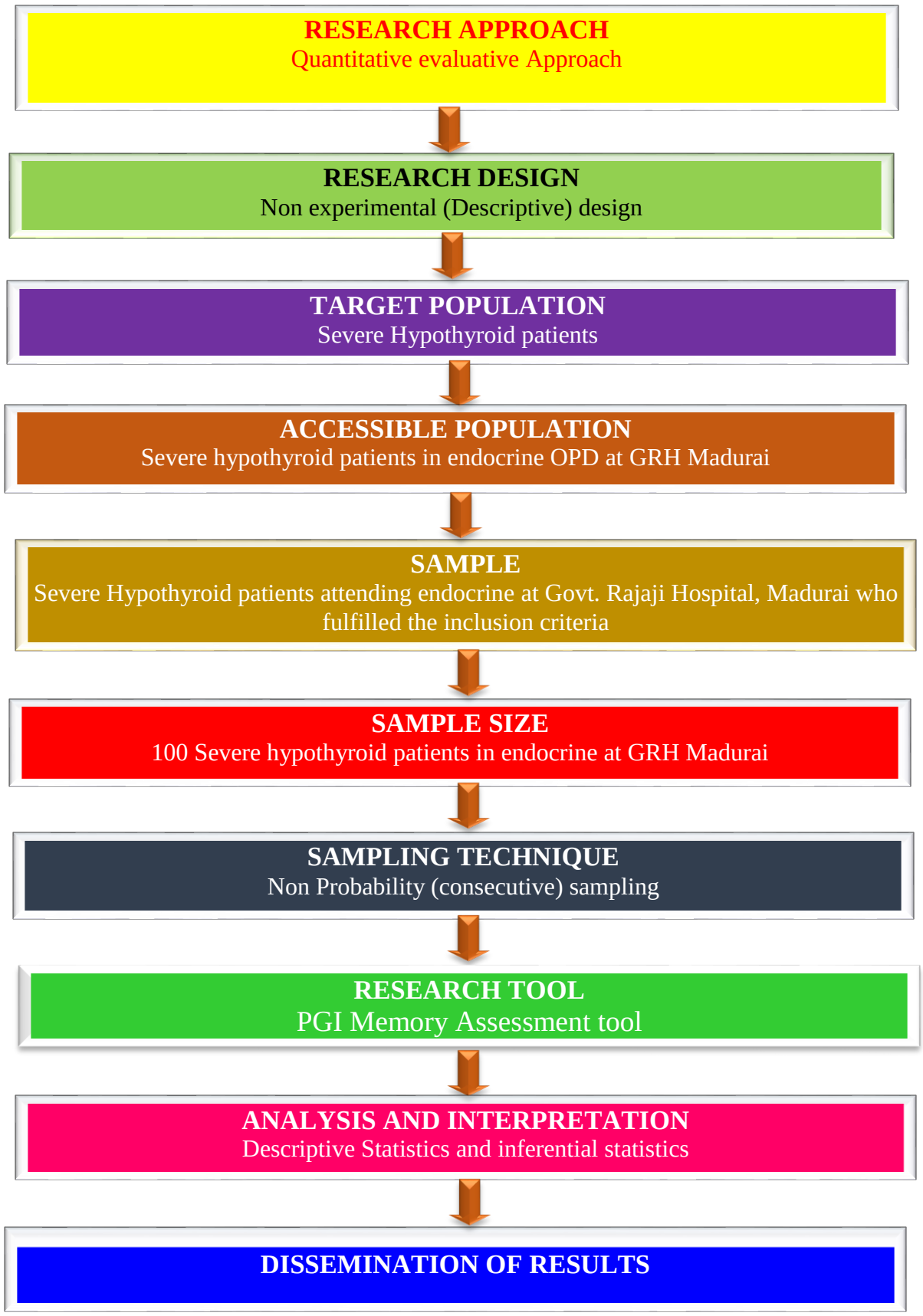
Inferential statistics

Chi-square analysis and independent ‘t’ test was used to find out the association between the level of memory impairment among severe hypothyroid patients with their selected socio demographic and clinical variables.

3.16 Protection of human rights

- The research proposal was approved by the dissertation committee, of college of Nursing, Madurai Medical College, Madurai, ethical committee Government Rajaji Hospital, and from the Head of the department of psychiatry to conduct the main study.
- Both verbal and written informed consent was obtained from all the study participants and the data collected was kept confidential.
- Positive benefits were explained to all the study subjects. They were also explained that they may withdraw from the study at any time without any penalty.
- Anonymity and confidentiality was maintained throughout the study.

3.18 Schematic representation of research methodology



DATA ANALYSIS AND INTERPRETATION

CHAPTER - IV

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the description of sample, analysis and interpretation of the of the data collected to evaluate the achievement of the objectives of the study. Statistical procedure enabled the investigator to deduce, summarize, organize, evaluate, interpret and communicate the numeric information. Statistical analysis is a method of rendering quantitative information meaningful and intelligible. In this chapter the data collected were edited, tabulated, analyzed and interpreted. The findings were organized and presented in the following orderly sections.

The data collected were organized under the following sections

Section I

Distribution of male and female severe hypothyroid patients according to their selected socio demographic and clinical variables.

Section II

Distribution on level of memory impairment among male severe hypothyroid patients.

Section III

Distribution of level of memory impairment among female severe hypothyroid patients.

Section IV

Comparison between the level of memory impairment among male and female severe hypothyroid patients.

Section V

Association between the level of memory impairment among male severe hypothyroid patients with their selected socio demographic and clinical variables.

Section VI

Association between the level of memory impairment among female severe hypothyroid patients with their selected socio demographic and clinical variables.

Section I

Distribution of male and female severe hypothyroid patients according to their selected socio demographic and clinical variables.

Table 1

Frequency and percentage distribution of subjects according to their selected socio demographic variables

Socio demographic variables		Gender				$\chi 2$
		Male (n=25)		Female (n=75)		
		f	%	f	%	
Age	20 -35	8	32.00%	37	49.33%	$\chi 2$=2.28 P=0.32(NS)
	36-45 years	11	44.00%	25	33.33%	
	>45 years	6	24.00%	13	17.33%	
Religion	Hindu	22	88.00%	66	88.00%	$\chi 2$=0.11 P=0.94(NS)
	Muslim	2	8.00%	5	6.67%	
	Christian	1	4.00%	4	5.33%	
Area of residence	Rural	10	40.00%	33	44.00%	$\chi 2$=2.12 P=0.35(NS)
	Urban	12	48.00%	39	52.00%	
	Sub urban	3	12.00%	3	4.00%	
Education status	No formal education	2	8.00%	8	10.67%	$\chi 2$=1.58 P=0.51(NS)
	Primary	12	48.00%	31	41.33%	
	High school	5	20.00%	23	30.66%	
	Secondary	4	16.00%	8	10.67%	
	Graduate	2	8.00%	5	6.67%	
Occupation status	Unemployed	2	8.00%	25	33.33%	$\chi 2$=7.86 P=0.10(NS)
	Coolie	9	36.00%	27	36.00%	
	Government	2	8.00%	4	5.34%	
	Private	9	36.00%	15	20.00%	
	Business	3	12.00%	4	5.33%	

Family income per month	Rs.2000 - 4000	2	8.00%	3	4.00%	$\chi 2=2.34$ P=0.50(NS)
	Rs.4000 - 6000	2	8.00%	15	20.00%	
	Rs.6000 - 8000	9	36.00%	25	33.33%	
	> Rs.8000	12	48.00%	32	42.67%	
Marital status	Married	22	88.00%	70	93.33%	$\chi 2=0.72$ P=0.39(NS)
	Single	3	12.00%	5	6.67%	
	Divorced	0	0.00%	0	0.00%	
	Separated	0	0.00%	0	0.00%	
Food habits	Vegetarian	3	12.00%	6	8.00%	$\chi 2=0.36$ P=0.54(NS)
	Non vegetarian	22	88.00%	69	92.00%	
Duration of illness	1-2yrs	8	32.00%	30	40.00%	$\chi 2=3.79$ P=0.28(NS)
	3-5 years	8	32.00%	26	34.67%	
	6-8 years	7	28.00%	9	12.00%	
	> 8 years	2	8.00%	10	13.33%	

The above table 1 explains the distribution of male and female severe hypothyroid patients according to their selected socio demographic variables.

According to the age group in male severe hypothyroid patients, majority 11 (44.00%) belonged to the age group between 35-45yrs, 8 (32.00%) belonged to the age group between 20-35yrs, 6 (24.00%) belonged to the age group above 45yrs. Whereas the age group in female severe hypothyroid patients the majority 37 (49.33%) belonged to the age group between20-35yrs 25 (33.33%) belonged to the age group between 36-45yrs, 13 (17.33% belonged to the age group more than 45yrs.

With regards to religion in male severe hypothyroid patients, the majority 22 (88.00%) were Hindu, 2 (8.00%) were Muslim and 1 (4.00%) were Christian. Whereas in female severe hypothyroid patients, majority 66 (88.00%) were Hindu, 5 (6.67%) were Muslim, 4 (5.33%) were Christian.

According to the area of residence in male severe hypothyroid patients, majority 12 (48.00%) hailed from urban area, 10 (40.00%) hailed from rural area, 3 (12.00%) hailed from suburban areas, whereas in female severe hypothyroid patients, majority 39 (52.00%), hailed from urban areas, 33 (44.00%) hailed from rural areas, 3 (4.00%) hailed from suburban areas.

While discussing educational status in male severe hypothyroid patients, majority 12 (48.00%) had primary education, 5 (20.00%) had high school education, 4 (16.00%) had higher secondary education, 2 (8.00%) had studied up to graduate, 2 (8.00%) had no formal education. On the other hand in female severe hypothyroid patients, majority 31 (41.33%) had primary education, 23 (30.66%) had high school education, 8 (10.67%) had higher secondary education, 8 (10.67%) had no formal education, 5 (6.67%) had studied graduate.

With respect of occupational status in male severe hypothyroid patients, majority 9 (36.00%) were Coolie, 9 (36.00%) were private employee, 3 (12.00%) were in business, 2 (8.00%) was government employee, 2 (8.00%) were unemployed. Whereas female severe hypothyroid patients, majority 27 (36.00%) were Coolie, 25 (33.33%) were unemployed, 15 (20.00%) were private employees, 4 (5.34%) were government employee, 4 (5.33%) in business.

As for as family income per month in male severe hypothyroid patients, majority 12 (48.00%) were earned> Rs. 8000, 9 (36.00%) were earned between Rs. 6000-8000, 2 (8.00%) were earned between Rs. 4000-6000, 2 (8.00%) were earned between Rs. 2000-4000. Whereas family income per month in female severe hypothyroid patients, majority 32 (42.67%) were earned > Rs. 8000, 25 (33.33%) were earned between Rs 6000-8000 per month, 15 (20.00%) were earned between Rs. 4000-6000, 3 (4.00%) were earned between Rs.2000- 4000.

While considering the marital status in male severe hypothyroid patients, majority 22 (88.00%) was married, 3 (12.00%) were single. Whereas female severe hypothyroid patients, majority 70 (93.33%) was married, 5 (6.67%) were single.

While mentioning the food habits in male severe hypothyroid patients, majority 22 (88.00%) were non vegetarian, 3 (12.00%) were vegetarian. Whereas female severe hypothyroid patients, majority 69 (92.00%) were non vegetarian, 6 (8.00%) were vegetarian.

While considering the duration of illness in male severe hypothyroid patients, majority 8 (32.00%) undergone the treatment between 1-2years, 8 (32.00%) undergone the treatment between 3-5years, 7 (28.00%) undergone the treatment between 6-8years, 2 (8.00%) undergone treatment more than8years. Whereas female severe hypothyroid patients, majority 30 (40.00%) undergone treatment 1-2 years, 26 (34.67%) undergone treatment between 3-5years, 10 (13.33%) undergone treatment more than 8years, 9 (12.00%) undergone treatment between 6-8years.

Distribution of subjects according to age

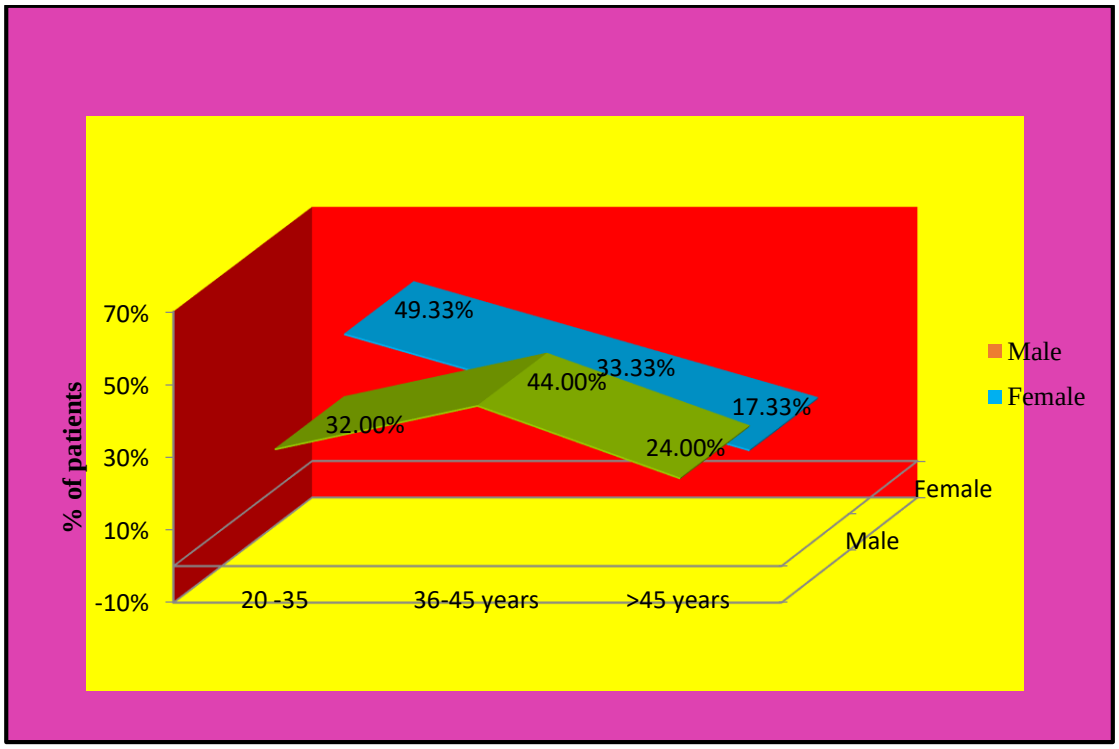


Figure 2: 3D Line diagram showing the distribution of subjects according to their age (in years)

According to the age group in male severe hypothyroid patients, majority 11 (44.00%) belonged to the age group between 35-45yrs, 8 (32.00%) belonged to the age group between 20-35yrs, 6 (24.00%) belonged to the age group above 45yrs. Whereas the age group in female severe hypothyroid patients the majority 37 (49.33%) belonged to the age group between20-35yrs 25 (33.33%) belonged to the age group between 36-45yrs, 13 (17.33% belonged to the age group more than 45yrs.

Distribution of subjects according to religion

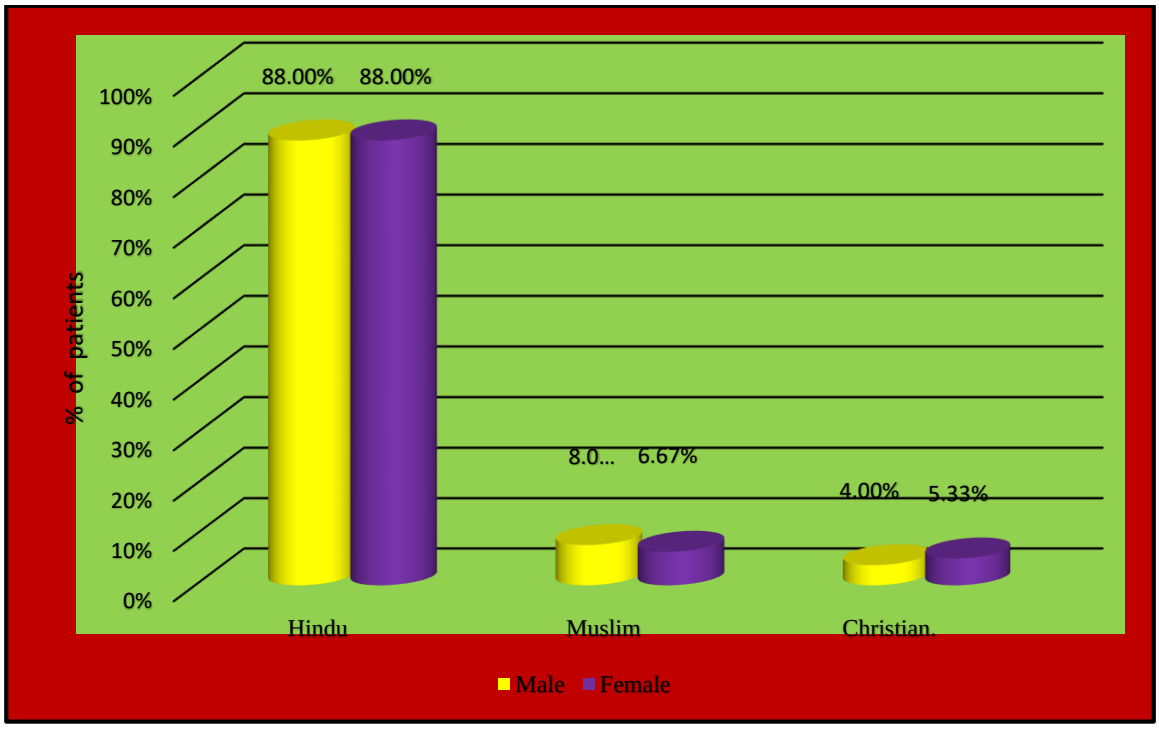


Figure 3: 3D Clustered Colum chart diagram showing the distribution of subjects according to their religion

With regards to religion in male severe hypothyroid patients, the majority 22 (88.00%) were Hindu, 2 (8.00%) were Muslim and 1 (4.00%) were Christian. Whereas in female severe hypothyroid patients, majority 66 (88.00%) were Hindu, 5 (6.67%) were Muslim, 4 (5.33%) were Christian.

Distribution of subjects according to area of residence.

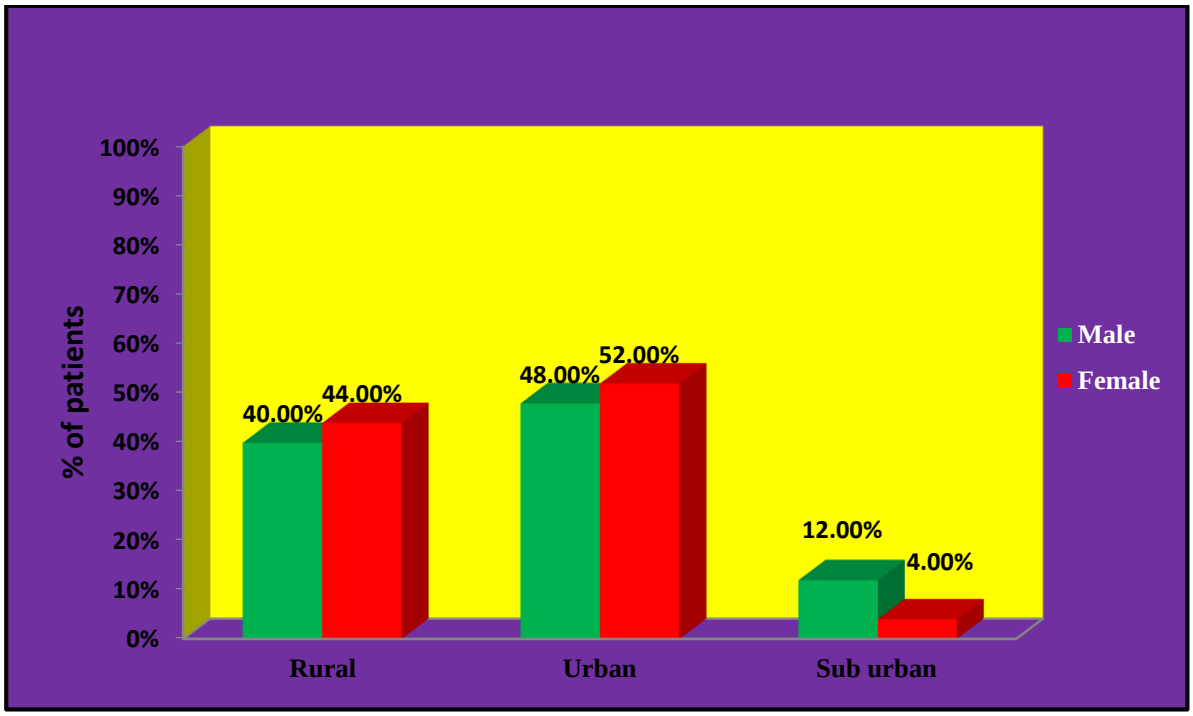


Figure 4: Bar diagram showing the distribution of subjects according to their area of residence.

According to the area of residence in male severe hypothyroid patients, majority 12 (48.00%) hailed from urban area, 10 (40.00%) hailed from rural area, 3 (12.00%) hailed from suburban areas, whereas in female severe hypothyroid patients, majority 39 (52.00%), hailed from urban areas, 33 (44.00%) hailed from rural areas, 3 (4.00%) hailed from suburban areas.

Distribution of subjects according to educational status

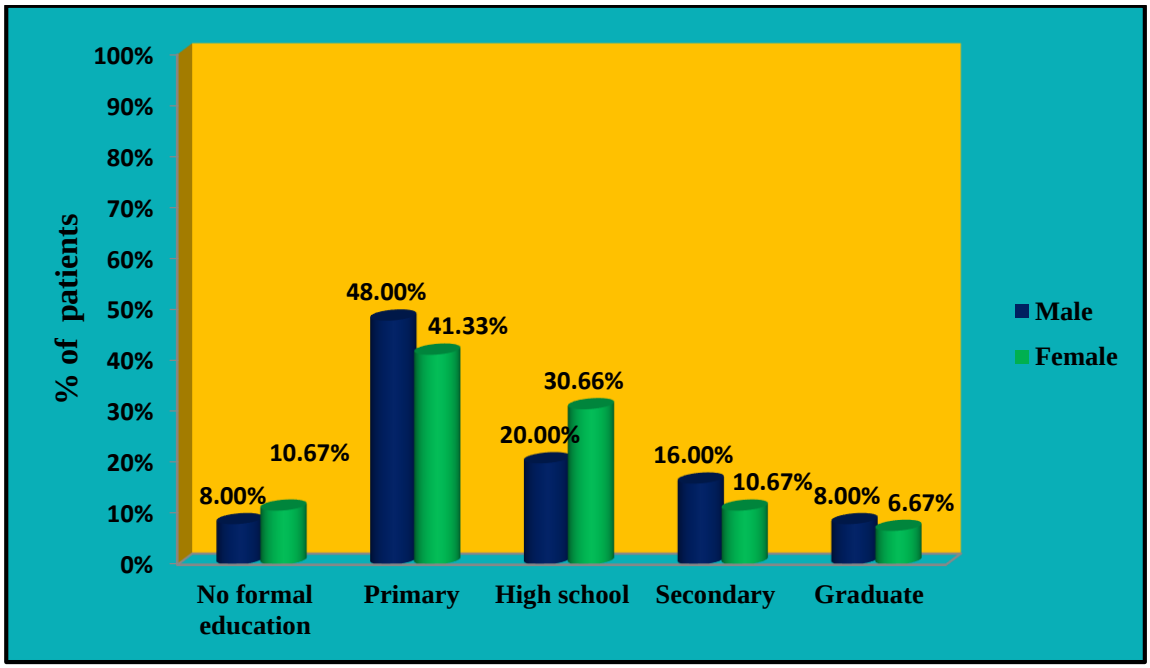


Figure 5: Cylinder diagram showing the distribution of subjects according to their Educational status.

While discussing educational status in male severe hypothyroid patients, majority 12 (48.00%) had primary education, 5 (20.00%) had high school education, 4 (16.00%) had higher secondary education, 2 (8.00%) had studied up to graduate, 2 (8.00%) had no formal education. On the other hand in female severe hypothyroid patients, majority 31 (41.33%) had primary education, 23 (30.66%) had high school education, 8 (10.67%) had higher secondary education, 8 (10.67%) had no formal education, 5 (6.67%) had studied graduate.

Distribution of subjects according to occupational status.

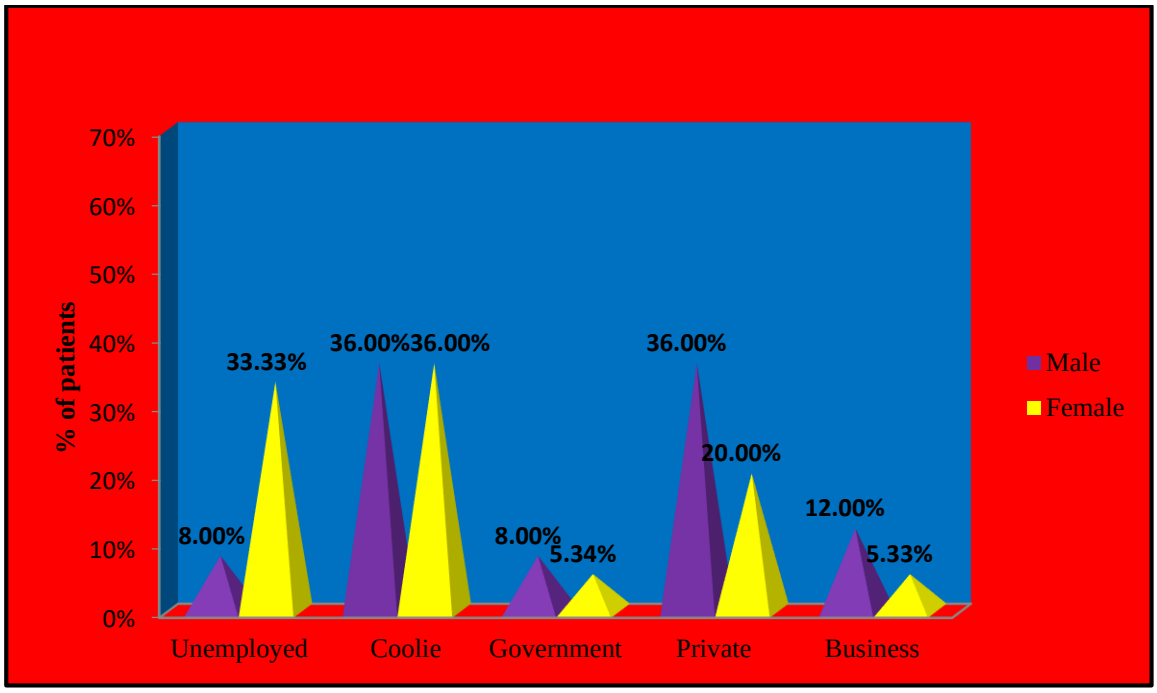


Figure 6: Cone diagram showing the distribution of subjects according to their occupational Status.

With respect of occupational status in male severe hypothyroid patients, majority 9 (36.00%) were Coolie, 9 (36.00%) were private employee, 3 (12.00%) were in business, 2 (8.00%) was government employee, 2 (8.00%) were unemployed. Whereas female severe hypothyroid patients, majority 27 (36.00%) were Coolie, 25 (33.33%) were unemployed, 15 (20.00%) were private employees, 4 (5.34%) were government employee, 4 (5.33%) in business.

Distribution of subjects according to monthly family income

Figure 7: Clustered bar diagram showing the distribution of subjects according to their monthly family income

As for as family income per month in male severe hypothyroid patients, majority 12 (48.00%) were earned more than Rs. 8000, 9 (36.00%) were earned between Rs. 6000-8000, 2 (8.00%) were earned between Rs. 4000-6000, 2 (8.00%) were earned between Rs. 2000-4000. Whereas family income per month in female severe hypothyroid patients, majority 32 (42.67%) were earned more than Rs. 8000, 25 (33.33%) were earned between Rs 6000-8000 per month, 15 (20.00%) were earned between Rs. 4000-6000, 3 (4.00%) were earned between Rs.2000- 4000.

Distribution of subjects according to marital Status.

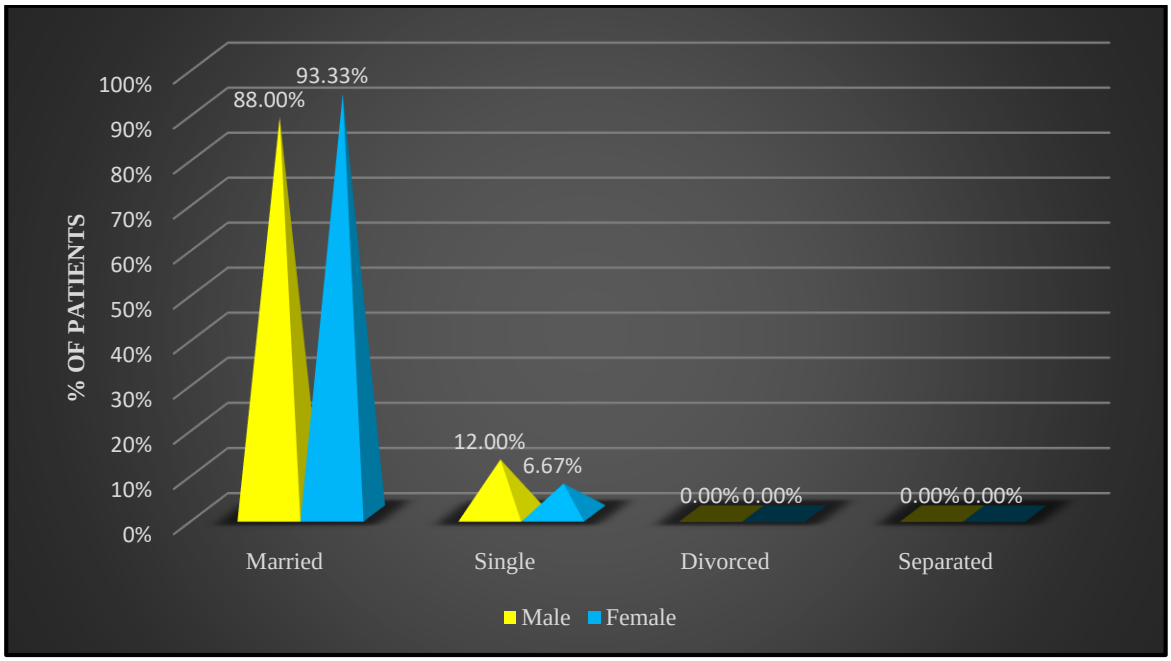


Figure 8: Multiple cone diagram showing the distribution of subjects according to their marital Status.

While considering the marital status in male severe hypothyroid patients, majority 22 (88.00%) was married, 3 (12.00%) were single. Whereas female severe hypothyroid patients, majority 70 (93.33%) was married, 5 (6.67%) were single.

Distribution of subjects according to food habits

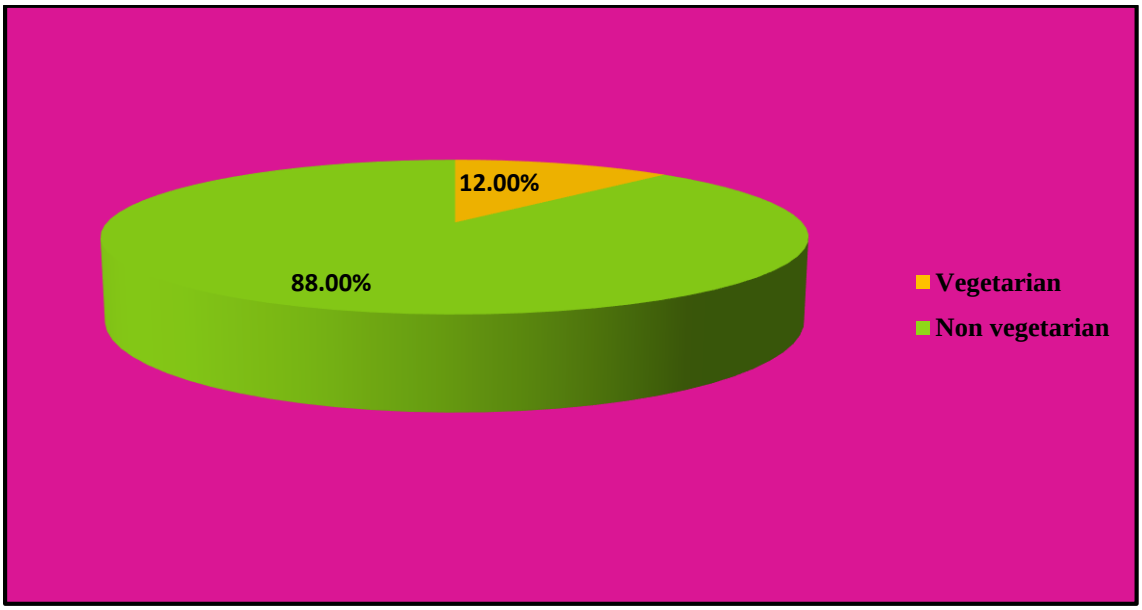


Figure 9: Pie diagram showing the distribution of subjects according to their food habits

While mentioning the food habits in male severe hypothyroid patients, majority 22 (88.00%) were non vegetarian, 3 (12.00%) were vegetarian. Whereas female severe hypothyroid patients, majority 69 (92.00%) were non vegetarian, 6 (8.00%) were vegetarian.

Distribution of subjects according to duration of illness

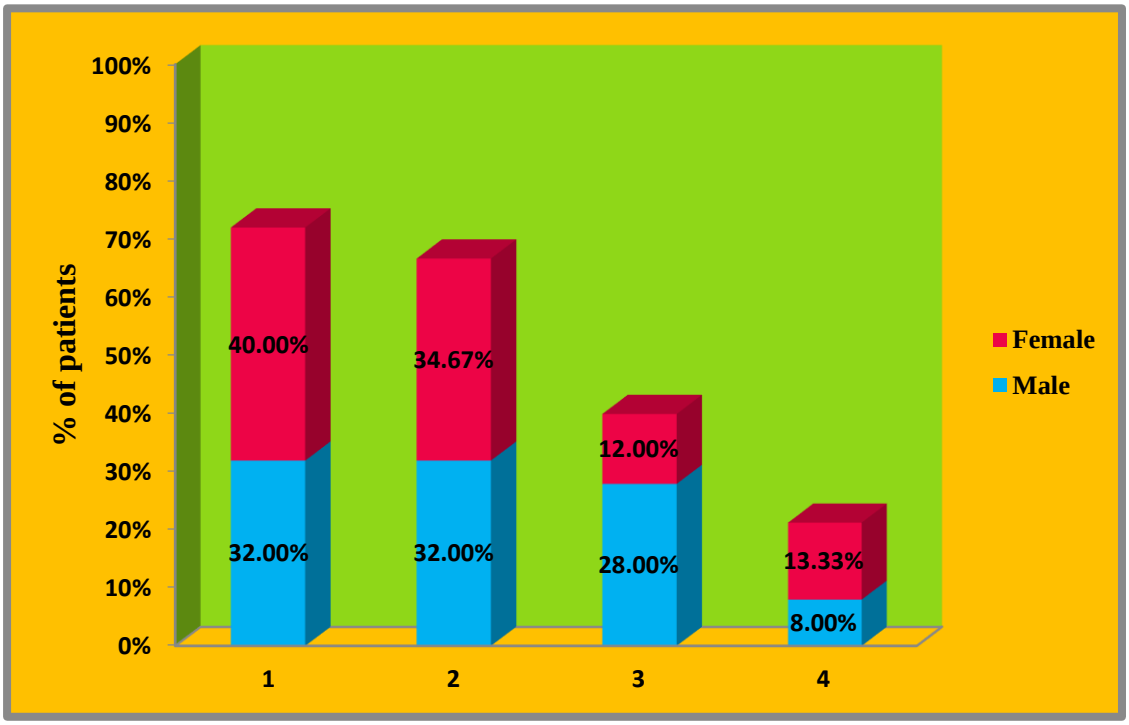


Figure 10: 3D stacked column diagram showing the distribution of subjects according to their duration of illness.

While considering the duration of illness in male severe hypothyroid patients, majority 8 (32.00%) undergone the treatment between 1-2years, 8 (32.00%) undergone the treatment between 3-5years, 7 (28.00%) undergone the treatment between 6-8years, 2 (8.00%) undergone treatment more than 8years. Whereas female severe hypothyroid patients, majority 30 (40.00%) undergone treatment 1-2 years, 26 (34.67%) undergone treatment between 3-5years, 10 (13.33%) undergone treatment more than 8years, 9 (12.00%) undergone treatment between 6-8years.

Table 2: Frequency and percentage distribution of subjects according to their clinical variables.

Clinical variables		Gender				$\chi 2$
		Male(n=25)		Female(n=75)		
		f	%	f	%	
TSH level	20-30 ml U/L	1	4.00%	6	8.00%	$\chi 2$=1.75 P=0.63(NS)
	31-40 ml U/L	1	4.00%	13	17.33%	
	41-50 ml U/L	8	32.00%	26	34.67%	
	>50 ml U/L	15	60.00%	30	40.00%	
T_3 level	70 ng/dl-80 ng/dl	3	12.00%	4	5.33%	$\chi 2$=1.89 P=0.69(NS)
	60 ng/dl-69ng/dl	10	40.00%	27	36.00%	
	50 ng/dl-59 ng/dl	11	44.00%	42	56.00%	
	< 50 ng/dl	1	4.00%	2	2.67%	
T_4 level	4.0 -5.0 microgram/dl	3	12.00%	8	10.67%	$\chi 2$=1.13 P=0.76(NS)
	3.0 -4.0 microgram/dl	8	32.00%	30	40.00%	
	2.0 -3.0 microgram/dl	11	44.00%	25	33.33%	
	< 1.0 microgram/dl	3	12.00%	12	16.00%	

The above table 2 explains the distribution of severe hypothyroid patients according to the clinical variables.

When comparing the TSH value of male severe hypothyroid patients, majority 15 (60.00%) were had more than 50 ml U/ L, 8 (32.00%) were had between 41-50 ml U/ L, 1 (4.00%) was had between 31-40 ml U/ L and 20-30 ml U/L, whereas TSH value of female severe hypothyroid patients, majority 30 (40.00%) were had more than 50 ml U/ L, 26 (34.67%) were had between 41-50 ml U/ L, 13 (17.33%) were had between 31-40 ml U/ L, 6 (8.00%) were had between 20-30 ml U/L.

While discussing T_3 value of male severe hypothyroid patients, majority 11 (44.00%) were had between 50ng/dl -59ng/dl,10 (40.00%) were had between 60ng/dl

-69ng/dl,3 (12.00%) were had between 70ng/dl -80ng/dl, 1 (4.00%) was had more than 50ng/dl, whereas T_3 value of female severe hypothyroid patients, majority 42 (56.00%) were had between 50ng/dl -59ng/dl, 27 (36.00%) were had between 60ng/dl -69ng/dl, 4 (5.33%) were comes under 70ng/dl -80ng/dl, 2 (2.67%) were had more than 50ng/dl. While discussing T_4 value of male severe hypothyroid patients, majority 11 (44.00%) were had between 2.0-3.0 microgram /dl, 8 (32.00%) were had between 3.0-4.0 microgram /dl, 3 (12.00%) were had between 4.0 -5.0 microgram /dl, 3 (12.00%) were had less between than 1.0 microgram /dl. whereas T_4 value of female severe hypothyroid patients, majority 30 (40.00%) were had between 3.0-4.0 microgram /dl, 25 (33.33%) were had between 2.0-3.0 microgram /dl,12 (16.00%) were had less than 1.0 microgram /dl, 8 (10.67%) were had between 4.0 -5.0 microgram /dl.

Distribution of subjects according to TSH level.

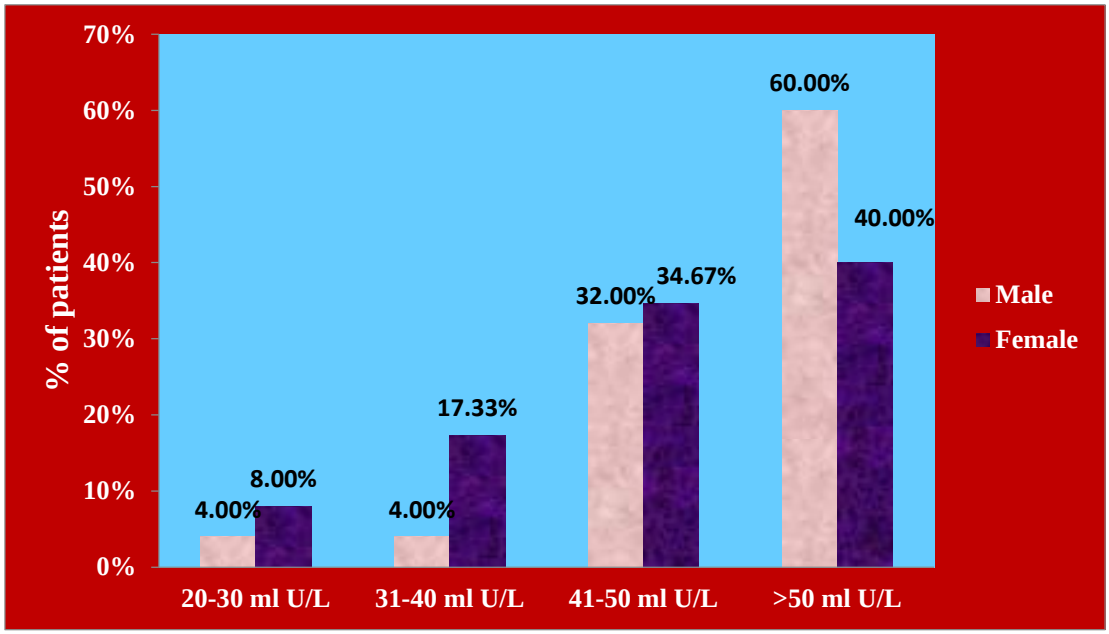


Figure 11: Multiple bar diagram showing the distribution of subjects according to their TSH level.

When comparing the TSH value of male severe hypothyroid patients, majority 15 (60.00%) were had more than 50 ml U/ L, 8 (32.00%) were had between 41-50 ml U/ L, 1 (4.00%) was had between 31-40 ml U/ L and 20-30 ml U/L, whereas TSH value of female severe hypothyroid patients, majority 30 (40.00%) were had more than 50 ml U/ L, 26 (34.67%) were had between 41-50 ml U/ L, 13 (17.33%) were had between 31-40 ml U/ L, 6 (8.00%) were had between 20-30 ml U/L.

Distribution of subjects according to T_3 level

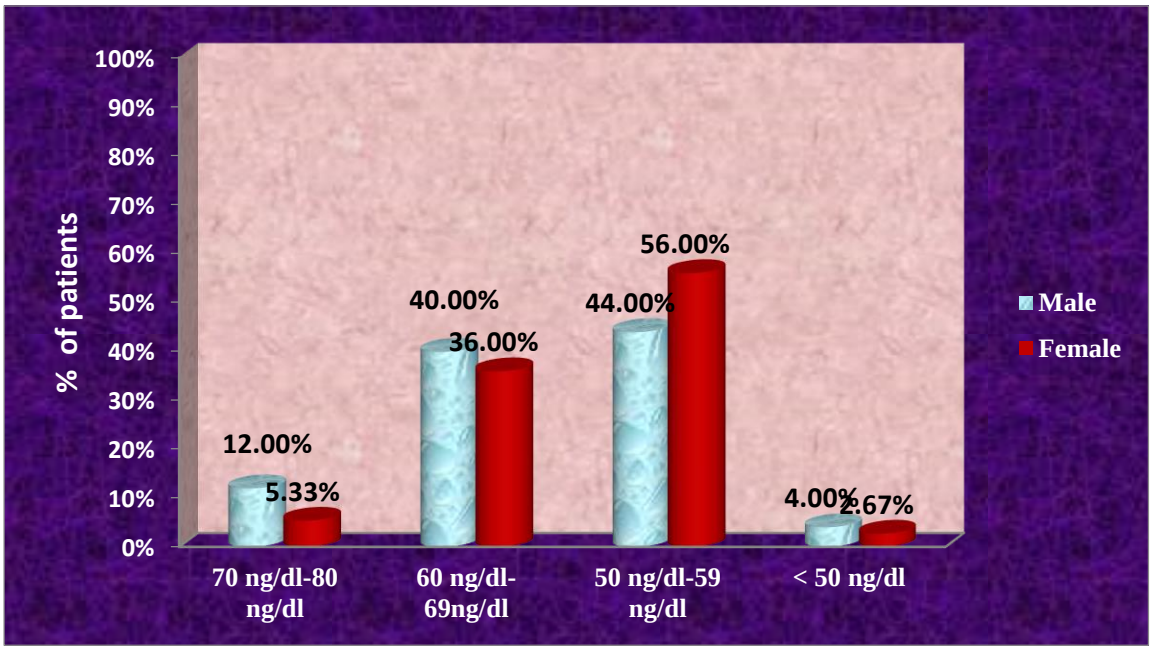


Figure 12: Multiple cylinder diagram showing the distribution of subjects according to their T_3 level.

While discussing T_3 value of male severe hypothyroid patients, majority 11 (44.00%) were had between 50ng/dl -59ng/dl,10 (40.00%) were had between 60ng/dl -69ng/dl,3 (12.00%) were had between 70ng/dl -80ng/dl, 1 (4.00%) was had more than 50ng/dl, whereas T_3 value of female severe hypothyroid patients, majority 42 (56.00%) were had between 50ng/dl -59ng/dl, 27 (36.00%) were had between 60ng/dl -69ng/dl, 4 (5.33%) were comes under 70ng/dl -80ng/dl, 2 (2.67%) were had more than 50ng/dl.

Distribution of subjects according to T_4 level

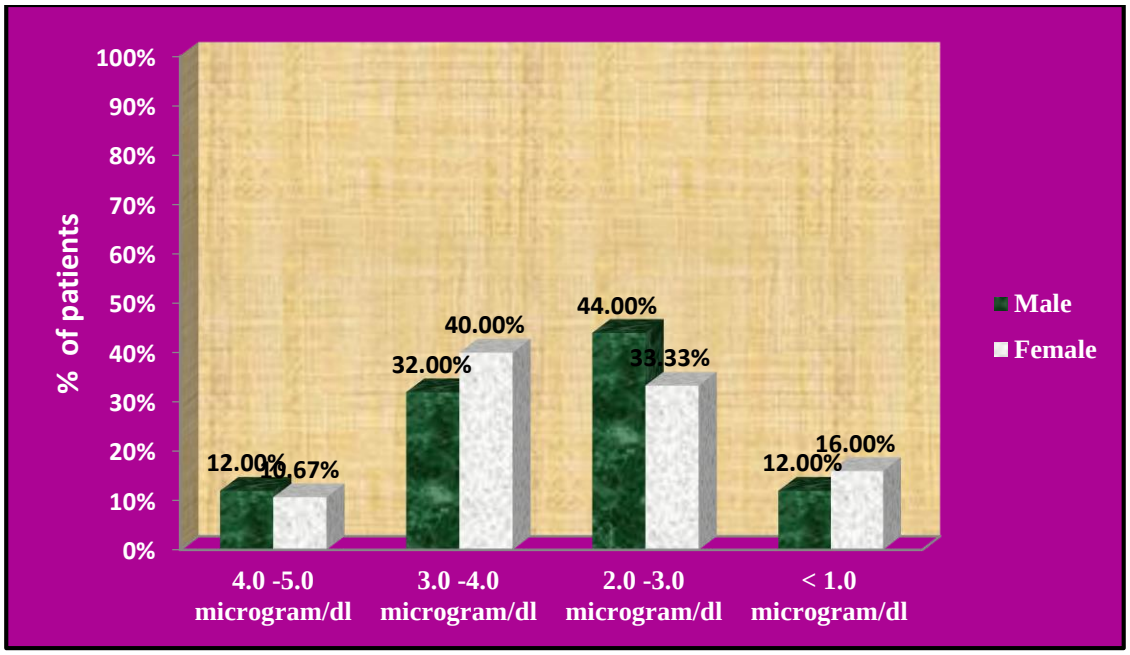


Figure 13: Bar diagram showing the distribution of subjects according to their T_4 level

While discussing T_4 value of male severe hypothyroid patients, majority 11 (44.00%) were had between 2.0-3.0 microgram /dl, 8 (32.00%) were had between 3.0-4.0 microgram /dl, 3 (12.00%) were had between 4.0 -5.0 microgram /dl, 3 (12.00%) were had less between than 1.0 microgram /dl. whereas T_4 value of female severe hypothyroid patients, majority 30 (40.00%) were had between 3.0-4.0 microgram /dl, 25 (33.33%) were had between 2.0-3.0 microgram /dl,12 (16.00%) were had less than 1.0 microgram /dl, 8 (10.67%) were had between 4.0 -5.0 microgram /dl.

Section II

Distribution on level of memory impairment among male severe hypothyroid patients

Table 3

Distribution of subjects according to their level of memory impairment

Level of memory impairment	f	%
Low level memory	0	0.00%
Below average	5	20.00%
Average	5	20.00%
Above average	15	60.00%
Excellent	0	0.00%
Total	**25**	**100.0%**

Table 3 shows the level of memory impairment among male severe hypothyroid patients.

While discussing the level of memory impairment among male severe hypothyroid patients, majority 15 (60.00%) of them had above average memory, 5 (20.00%) of them had below average memory and average memory, none of them had low level memory or excellent memory.

Level of memory impairment among male severe hypothyroid patients.

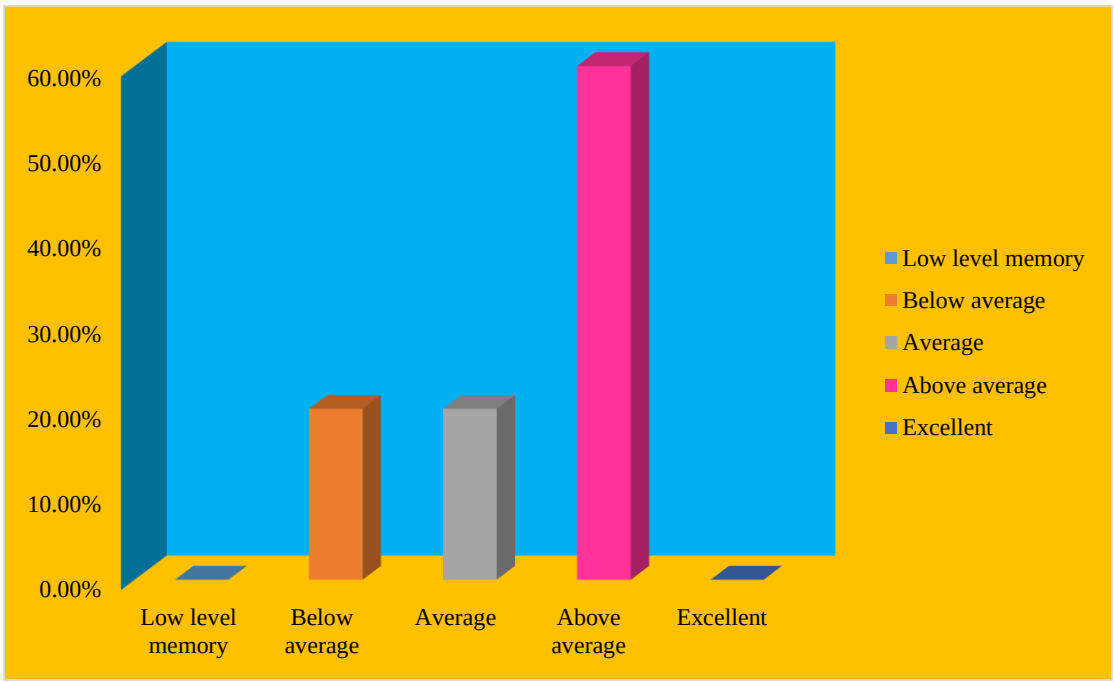


Figure 14: Bubble diagram showing the level of memory impairment among male severe hypothyroid patients.

While discussing the memory level among male severe hypothyroid patients, majority 15 (60.00%) of them had above average memory, 5 (20.00%) of them had below average memory and 5 average memory, none of them had low level memory or excellent memory.

Section III

Distribution on level of memory impairment among female severe hypothyroid patients

Table 4

Distribution of subjects according to their level of memory impairment

Level	f	%
Low level memory	0	0.00%
Below average	4	5.33%
Average	29	38.67%
Above average	42	56.00%
Excellent	0	0.00%
Total	**75**	**100.0%**

Table 4 shows the level of memory impairment among female severe hypothyroid patients.

While discussing memory level among female severe hypothyroid patients, majority 42 (56.00%) of them had above average memory, 29 (38.67%) of them had average memory, 4 (5.33%) had below average memory, none of them had low level memory or excellent memory.

Distribution on level of memory impairment among female severe hypothyroid patients

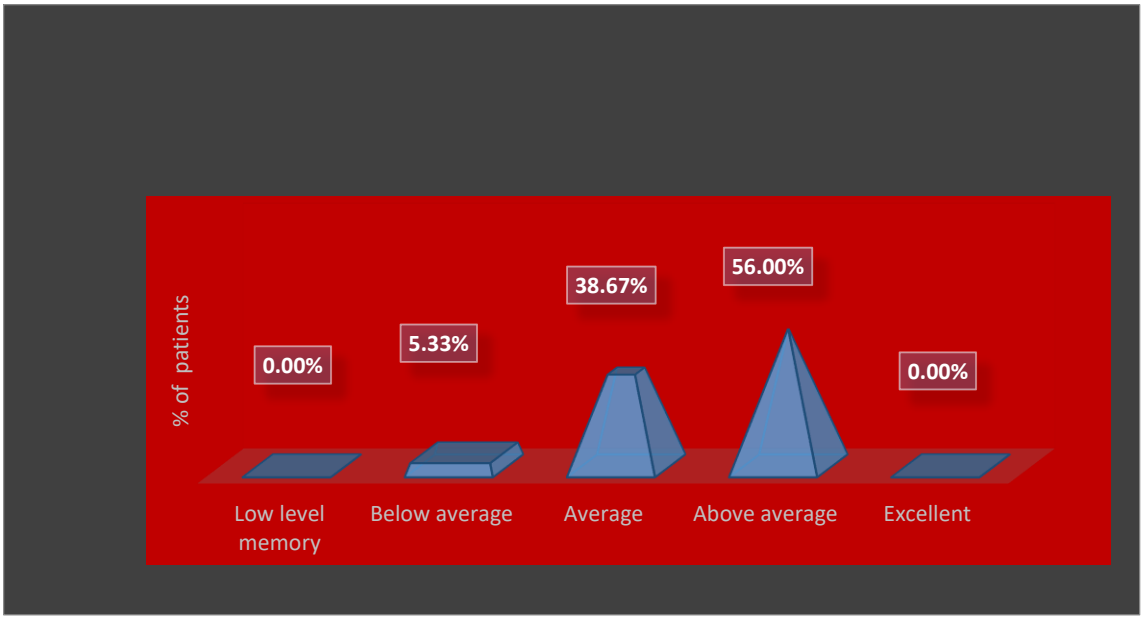


Figure 15: Partial pyramid diagram showing the distribution of level of memory impairment among female severe hypothyroid patients

While discussing memory level among female severe hypothyroid patients, majority 42 (56.00%) of them had above average memory, 29 (38.67%) of them had average memory, 4 (5.33%) had below average memory, none of them had low level memory or excellent memory.

Section IV

Comparison between the level of memory impairment among male and female severe hypothyroid patients.

Table 5

Frequency and percentage distribution of subjects according to their level of memory Impairment.

Level of memory impairment	Male		Female		$\chi 2$
	f	%	f	%	
Low level memory	0	0.00%	0	0.00%	**$\chi 2$=6.45**
Below average	5	20.00%	4	5.33%	**P=0.04*(S)**
Average	5	20.00%	29	38.67%	
Above average	15	60.00%	42	56.00%	
Excellent	0	0.00%	0	0.00%	
Total	**25**	**100.0%**	**75**	**100.0%**	

***P< 0.05 significant S= significant**

The above table 5 compares the level of memory impairment score among Severe hypothyroid male and female patients.

Among male severe hypothyroid patients 15 (60%) had above average level, and 5 (20%) had average or below average level and none of them had low level or excellent level of memory impairment.

Where as in female severe hypothyroid patients 42 (56%) had above average level and 29 (38.67%) had average level, 4 (5.33%) had below average level and none of them had low level or excellent level of memory impairment.

Comparison between the level of memory impairment among male and female severe hypothyroid patients.

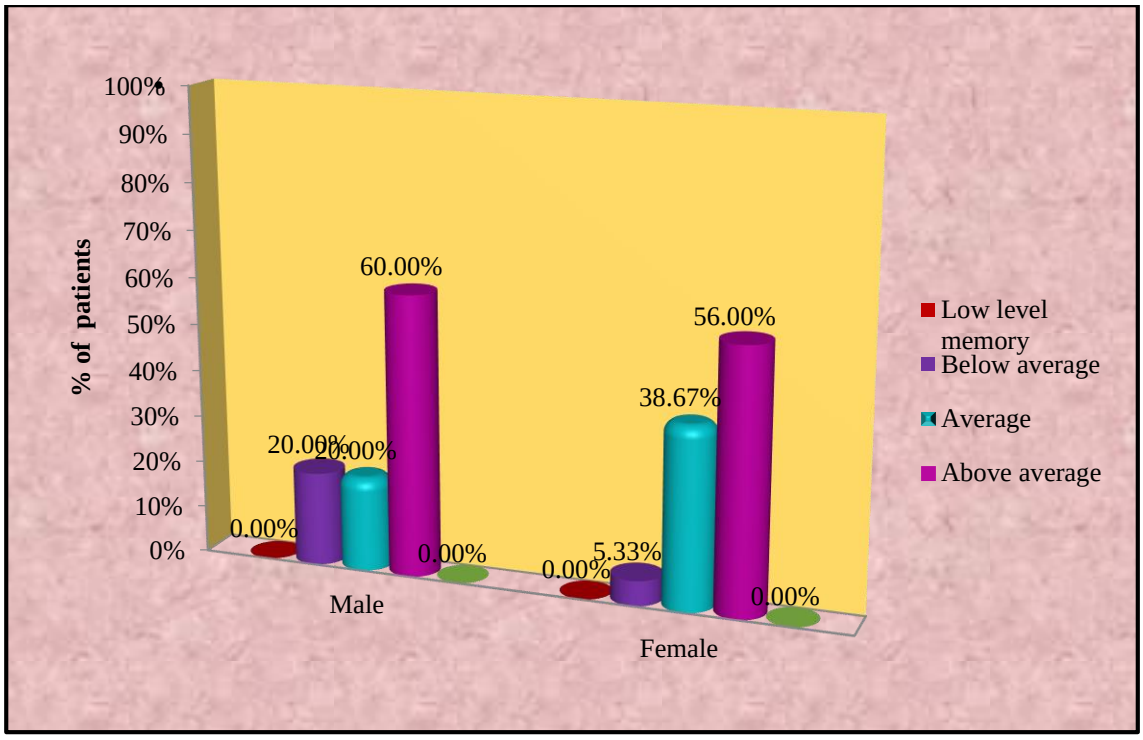


Figure 16: multiple cylinder diagram shows comparison between the level of memory impairment among male and female severe hypothyroid patients

While explaining memory impairment among male severe hypothyroid patients 15 (60%) had above average level, and 5 (20%) had average or below average level and none of them had low level or excellent level of memory impairment, where as in female severe hypothyroid patients 42 (56%) had above average level and 29 (38.67%) had average level, 4 (5.33%) had below average level and none of them had low level or excellent level of memory impairment.

Table 6: Distribution on level of memory impairment among male severe hypothyroid Patients according to their domains.

S.No	Domains	Score	Mean	SD	% of Mean
1	**Remote memory**	7	4.92	.81	70.29%
2	**Recent memory**	5	3.92	.81	78.40%
3	**Mental balance**	9	6.28	1.24	69.78%
4	**Attention ,concentration**	28	8.28	2.23	29.57%
5	**Delayed recall**	10	8.28	1.54	82.80%
6	**Immediate Recall**	12	9.04	2.15	75.33%
7	**Verbal Retention similar pairs**	5	4.20	.91	84.00%
8	**Verbal Retention dissimilar pairs**	15	9.24	4.25	61.60%
9	**Visual retention**	13	7.60	2.40	58.46%
10	**Recognition**	10	8.24	2.03	82.40%
	Total	**114**	**70.00**	**8.58**	**61.40%**

The above table 6 shows distribution on level of memory impairment among male severe hypothyroid patients according to their domains.

In remote memory, the mean score was 4.92 with SD 0.81 (70.29% of mean) whereas in recent memory, the mean score 3.92 with SD 0.81 (78.40% of mean).

In mental balance, the mean score was 6.28 with SD 1.24 (69.78% of mean) where as in attention concentration, the mean score was 8.28 with SD 2.23 (29.57% of mean).

While discussing in delayed recall, the mean score was 8.28 with SD 1.54 (82.80% of mean) where as in immediate recall, the mean score was 4.20 with SD 0.91 (84.00% of mean).

In verbal retention of similar pairs, the mean score was 9.04 with SD 2.15 (75.33% of mean) where as in verbal retention of dissimilar pairs the mean score was 9.24 with SD 4.25 (61.60% of mean).

In visual retention, the mean score was 7.60 with SD 2.40 (58.46% of mean), where as in recognition, the mean score was 8.24 with SD 2.03 (82.40% of mean).

Table 7: Distribution on level of memory impairment among female severe hypothyroid Patients according to their domains.

S.No	Domains	Maximum score	Mean	SD	% of Mean
1	**Remote memory**	7	4.24	1.25	60.57%
2	**Recent memory**	5	3.55	.78	71.00%
3	**Mental balance**	9	6.16	2.16	68.44%
4	**Attention ,concentration**	28	8.03	2.57	28.68%
5	**Delayed recall**	10	7.47	1.75	74.70%
6	**Immediate Recall**	12	8.13	2.41	67.75%
7	**Verbal retention of similar pairs**	5	3.61	1.30	72.20%
8	**Verbal retention of dissimilar pairs**	15	9.05	4.15	60.33%
9	**Visual retention**	13	6.20	2.82	47.69%
10	**Recognition**	10	7.09	2.57	70.90%
	Total	**114**	**63.53**	**13.84**	**55.73%**

The above table 7 shows the distribution on level of memory impairment among female severe hypothyroid patients according to their domains.

The mean was 4.24 with SD 1.25 (60.57% of mean) in remote memory, and the mean was 3.55 with SD 0.78 (71.00% of mean) in recent memory.

While mentioning mental balance the mean score was 6.16 with SD 2.16 (68.44% of mean) where as in attention concentration the mean score was 8.03 with SD 2.57 (28.68% of mean).

The mean was 7.47 with SD 1.75 (74.70% of mean) in delayed recall and the mean score was 8.13 with SD 2.41 (67.75% of mean) in immediate recall.

While stating the mean score was 3.61 with SD 1.30 (72.20% of mean) in verbal retention of similar pairs whereas the mean was 9.05 with SD 4.15 (60.33% of mean) in verbal retention of dissimilar pairs.

The mean was 6.20 with SD 2.82 (47.69% of mean) in visual retention and the mean score was 7.09 with SD 2.57 (70.90% of mean) in recognition.

Table 8: Mean and mean difference score on level of memory impairment among male and female severe hypothyroid patients according to their domains.

S.No	Domains	Male mean %	Female mean %	% of Mean Difference
1	**Remote memory**	70.29%	60.57%	9.72%
2	**Recent memory**	78.40%	71.00%	7.40%
3	**Mental balance**	69.78%	68.44%	1.34%
4	**Attention ,concentration**	29.57%	28.68%	0.89%
5	**Delayed recall**	82.80%	74.70%	8.10%
6	**Immediate Recall**	75.33%	67.75%	7.58%
7	**Verbal retention for similar pairs**	84.00%	72.20%	11.80%
8	**Verbal retention for dissimilar pairs**	61.60%	60.33%	1.27%
9	**Visual retention**	58.46%	47.69%	10.77%
10	**Recognition**	82.40%	70.90%	11.50%
	Total	**61.40%**	**55.73%**	**5.67%**

The above table 8 describes the distribution of mean and mean difference score among male and female severe hypothyroid patients according to their domains.

While describing the level of memory impairment in male the mean score was 84.00 % and in females 72.20 % and the mean difference was 11.80% in verbal retention of similar pairs,

While stating the mean score in male 82.80 % and in females 74.70% and the mean difference was 8.10% in delayed recall.

In males, the mean score was 82.40 % and in females, mean score was 70.90% and the mean difference was 11.50% in recognition.

While mentioning mean score in males 78.40 % and in females was 71.00% and the mean difference was 7.40% in recent memory.

In males, the mean score was 75.33 % and in females 67.75% and the mean difference was 7.58% in immediate recall.

While describing mean score in males 70.29 % and in females 60.57% and the mean difference was 9.72% in recognition.

In males, the mean score was 69.78 % and in females the mean score was 68.44% and the mean difference was 1.34% in mental balance.

In males the mean score was 61.60 % and in females 60.33% and the mean difference was 1.27% in verbal retention of dissimilar pairs.

While stating the mean score in males 58.46 % and in females 47.69% and the mean difference was 10.77% in visual retention.

In males the mean score was 29.57 % and in females the mean score was 26.68% and the mean difference was 0.89% in attention and concentration.

Level of memory impairment mean difference percentage score between male and female severe hypothyroid patients according to their domains.

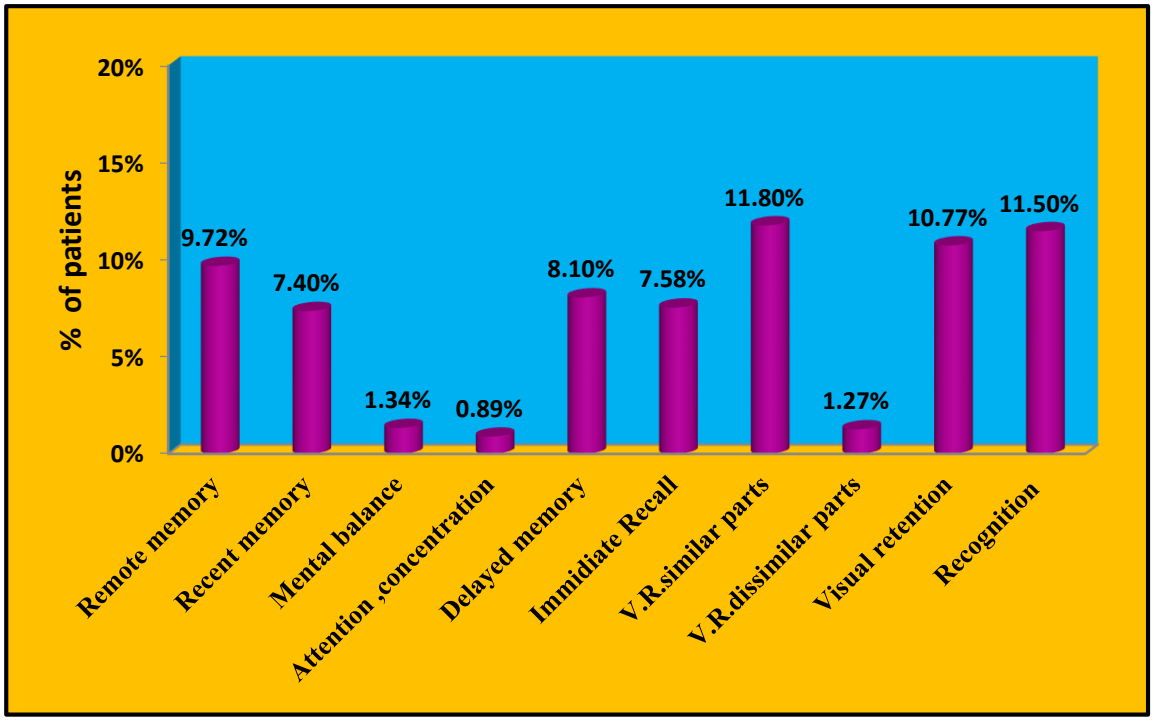


Figure 17: Multiple cylinder diagram showing level of memory impairment mean difference percentage score between male and female severe hypothyroid patients according to their domains.

The above cylinder diagram describes the distribution of mean and mean score among male and female severe hypothyroid patients according to their domains.

While describing the level of memory score of severe hypothyroid patients in male the mean score was 84.00 % and in females 72.20 % and the mean difference was 11.80% in verbal retention of similar pairs,

While stating the mean score in male 82.80 % and in females 74.70% and the mean difference was 8.10% in delayed recall.

In males, the mean score was 82.40 % and in females, mean score was 70.90% and the mean difference was 11.50% in recognition.

While mentioning mean score in males 78.40 % and in females was 71.00% and the mean difference was 7.40% in recent memory.

In males, the mean score was 75.33 % and in females 67.75% and the mean difference was 7.58% in immediate recall.

While describing mean score in males 70.29 % and in females 60.57% and the mean difference was 9.72% in recognition.

In males, the mean score was 69.78 % and in females the mean score was 68.44% and the mean difference was 1.34% in mental balance.

In males the mean score was 61.60 % and in females 60.33% and the mean difference was 1.27% in verbal retention of dissimilar pairs.

While stating the mean score in males 58.46 % and in females 47.69% and the mean difference was 10.77% in visual retention.

In males the mean score was 29.57 % and in females the mean score was 26.68% and the mean difference was 0.89% in attention and concentration.

Table 9: Comparison between level of memory impairment among male and female severe hypothyroid Patients according to their domains.

Domains	Male		Female		Mean Difference	Student independent t-test
	Mean	SD	Mean	SD		
Remote memory	4.92	.81	4.24	1.25	0.68	**t=2.54 P=0.01** (S)**
Recent memory	3.92	.81	3.55	.78	0.37	**t=2.05 P=0.05*(S)**
Mental balance	6.28	1.24	6.16	2.16	0.12	t=0.26 P=0.79 (NS)
Attention ,concentration	8.28	2.23	8.03	2.57	0.25	t=1.26 P=0.73 (NS)
Delayed recall	8.28	1.54	7.47	1.75	0.81	**t=2.07 P=0.04* (S)**
Immediate Recall	9.04	2.15	8.13	2.41	0.91	t=1.67 P=0.10 (NS)
Verbal retention for similar pairs	4.20	.91	3.61	1.30	0.59	**t=2.08 P=0.05* (S)**
Verbal retention for dissimilar pairs	9.24	4.25	9.05	4.15	0.19	t=1.01 P=0.35 (NS)
Visual retention	7.60	2.40	6.20	2.82	1.40	**t=2.22 P=0.02* (S)**
Recognition	8.24	2.03	7.09	2.57	1.15	**t=2.03 P=0.05* (S)**
Total	**70.00**	**8.58**	**63.53**	**13.84**	**6.47**	**t=23.25 P=0.001*** (S)**

*** P<0.05 significant **P<0.01 highly significant S=significant NS=not significant**

The above table 9 shows the Comparison between the level of memory impairment among male and female severe hypothyroid patients according to their domains.

While describing remote memory in male the mean score 4.92 with SD 0.81 where as in female the mean score was 4.24 with SD 1.25 and the mean difference 0.68 and the calculated “t” value 2.54 at 0.01 level.

In male the mean score in recent memory 3.92 with SD 0 .81 where as in female the mean score was 3.55 with SD 0 .78 the mean difference 0.37 and the calculated “t” value 2.05 at 0.05 level.

While mentioning delayed recall in male the mean score was 8.28 with SD 1.54 where as in female the mean score was 7.47 with SD 1.75 and the mean difference was 0.81 and the calculated “t” value 2.07 at 0.04 level.

In male the mean score in verbal retention of similar pairs 4.20 with SD 0.91 where as in female the mean score was 3.61 with SD 1.30 the mean difference 0.59 and the calculated “t” value 2.08, at 0.05 level.

While stating visual retention in male the mean score was 7.60 with SD 2.40 where as in female the mean score was 6.20 with SD 2.82, the mean difference 1.40 and the calculated “t” value 2.22 at 0.02 level.

In male the mean score in recognition 8.24 with SD 2.03 where as in female the mean score was 7.09 with SD 2.57, mean difference 1.15 and calculated “t” value 2.03 at 0.05 level.

Comparison between level of memory impairment among male and female severe hypothyroid patients.

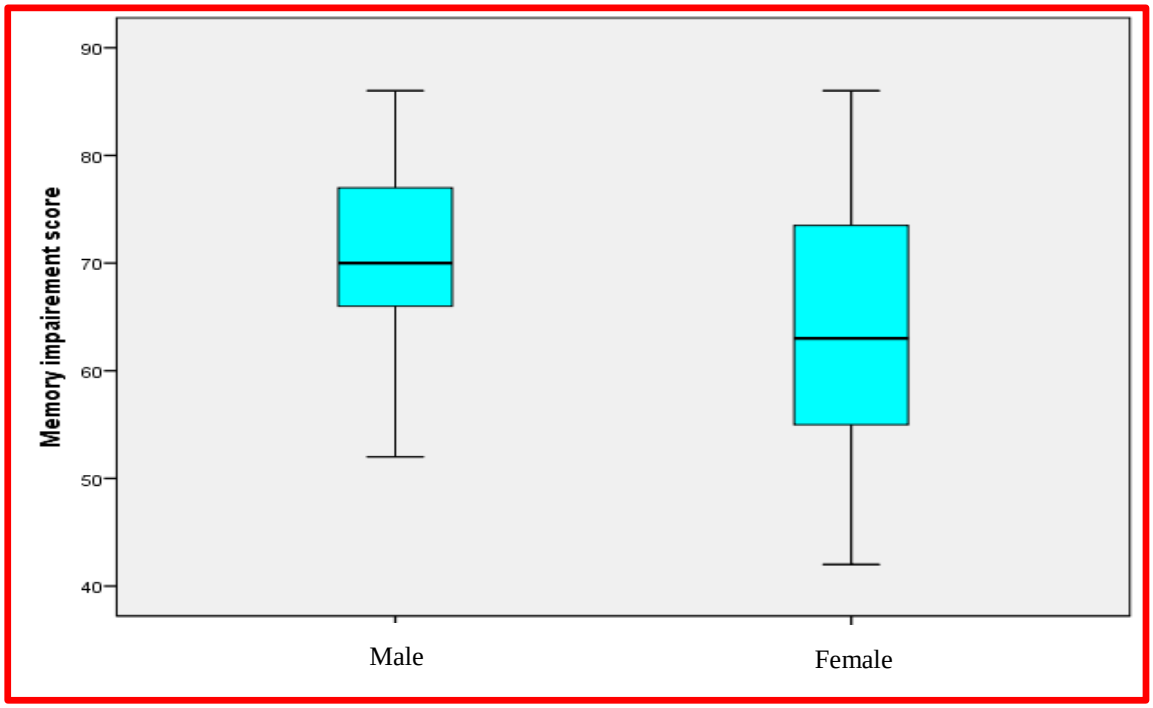


Figure 18: Box plot diagram shows the comparison on level of memory impairment among male and female severe hypothyroid patients.

While comparing the memory impairment, in male the mean score was 70.00 with SD 8.58 where as in female 63.53 with SD 13.84, mean difference is 6.47 other variables was not significantly associated with memory impairment.

Section V

Association between the level of memory impairment with their selected socio demographic and clinical variables among male severe hypothyroid patients.

Table 10

Association between the levels of memory impairment among male severe hypothyroid patients with their selected socio demographic variables.

Socio Demographic variables		Level of memory impairment						n	χ2
		Below average		Average		Above average			
		f	%	f	%	f	%		
Age	20 -35	0	0.0%	3	37.5%	5	62.5%	8	**χ2=10.30 P=0.03*(S)**
	36-45 years	1	9.1%	1	9.1%	9	81.8%	11	
	>45 years	4	66.7%	1	16.7%	1	16.7%	6	
Religion	Hindu	3	13.6%	4	18.2%	15	68.2%	22	χ2=7.72 P=0.10(NS)
	Muslim	1	50.0%	1	50.0%	0	0.0%	2	
	Christian	1	100.0%	0	0.0%	0	0.0%	1	
Area of residence	Rural	4	40.0%	4	40.0%	2	20.0%	10	**χ2=11.38 P=0.02*(S)**
	Urban	1	8.3%	1	8.3%	10	83.3%	12	
	Sub urban	0	0.0%	0	0.0%	3	100.0%	3	
Education status	No formal education	0	0.0%	1	50.0%	1	50.0%	2	χ2=4.00 P=0.86(NS)
	Primary	2	16.7%	4	33.3%	6	50.0%	12	
	High school	2	40.0%	0	0.0%	3	60.0%	5	
	Secondary	1	25.0%	0	0.0%	3	75.0%	4	
	Graduate	0	0.0%	0	0.0%	2	100.0%	2	
Occupation status	Unemployed	0	0.0%	0	0.0%	2	100.0%	2	χ2=7.87 P=0.44(NS)
	Coolie	2	22.2%	1	11.1%	6	66.7%	9	
	Government	0	0.0%	0	0.0%	2	100.0%	2	
	Private	1	11.1%	4	44.4%	4	44.4%	9	
	Business	2	66.7%	0	0.0%	1	33.3%	3	

Family income per month	Rs.2000 – 4000	0	0.0%	1	50.0%	1	50.0%	2	
	Rs.4000 – 6000	0	0.0%	1	50.0%	1	50.0%	2	$\chi 2=5.18$
	Rs.6000 – 8000	1	11.1%	1	11.1%	7	77.8%	9	P=0.52(NS)
	> Rs.8000	4	33.3%	2	16.7%	6	50.0%	12	
Marital status	Married	4	18.2%	3	13.6%	15	68.2%	22	
	Single	1	33.3%	2	66.7%	0	0.0%	3	$\chi 2=4.26$
	Divorced	0	0.0%	0	0.0%	0	0.0%	0	P=0.64(NS)
	Separated	0	0.0%	0	0.0%	0	0.0%	0	
Food habits	Vegetarian	0	0.0%	0	0.0%	3	100.0%	3	$\chi 2=1.07$
	Non vegetarian	5	22.7%	5	22.7%	12	54.5%	22	P=0.58(NS)
Duration of illness	1-2yrs	0	0.0%	1	12.5%	7	87.5%	8	
	3-5 years	0	12.5%	1	12.5%	7	87.5%	8	**$\chi 2=13.20$**
	6-8 years	3	42.9%	3	42.9%	1	14.3%	7	**P=0.05*(S)**
	> 8 yrs	2	100.0%	0	0.0%	0	0.0%	2	

*** P < 0.05 significant **P < 0.01 highly significant S = Significant NS = Not significant**

The above table 10 explains the association between the level of memory impairment score among male severe hypothyroid patients with their selected socio demographic variables. Chi-square analysis reveals that there was a statistically significant association between memory impairment and **age** ($\chi 2=10.30$) (P=0.03), **area of residence** ($\chi 2=11.38$) (P=0.02), **duration of illness** ($\chi 2=13.20$) (P=0.05) (ie) age between 36 -45 years, lived in urban area, duration of illness less than 5years. All other variables was not statistically associated with memory impairment among male severe hypothyroid patients.

Table 11: Association between the level of memory impairment among male severe hypothyroid patients with their selected clinical variables.

Clinical Variables		Level of memory impairment						n	$\chi 2$
		Below average		Average		Above average			
		f	%	f	%	f	%		
TSH level	20-30 ml U/L	0	0.0%	0	0.0%	2	100.0%	1	$\chi 2$=1.60 P=0.95(NS)
	31-40 ml U/L	0	0.0%	0	0.0%	2	100.0%	1	
	41-50 ml U/L	2	25.0%	2	25.0%	4	50.0%	8	
	>50 ml U/L	3	23.1%	3	23.1%	7	53.8%	15	
T_3 level	70 ng/dl-80 ng/dl	0	0.0%	1	33.3%	2	66.7%	3	$\chi 2$=1.91 P=0.93(NS)
	60 ng/dl-69ng/dl	3	30.0%	1	10.0%	6	60.0%	10	
	50 ng/dl-59 ng/dl	2	18.2%	3	27.3%	6	54.5%	11	
	< 50 ng/dl	0	0.0%	0	0.0%	1	100.0%	1	
T_4 level	4.0 -5.0 microgram/dl	0	0.0%	0	0.0%	3	100.0%	3	**$\chi 2$=12.04 P=0.05*(S)**
	3.0 -4.0 microgram/dl	0	0.0%	3	37.5%	5	62.5%	8	
	2.0 -3.0 microgram/dl	2	18.2%	2	18.2%	7	63.6%	11	
	< 1.0 microgram/dl	3	100.0%	0	0.0%	0	00.0%	3	

*** P<0.05 significant **P<0.01 highly significant S=significant NS=not significant**

The above table 11 explains the association between the level of memory impairment score among male severe hypothyroid patients with their clinical variables, chi – square test reveals that there was a statistical significant association between memory impairment and **T_4 level** ($\chi 2$=12.04) (P=0.05), (ie) 2.0- 3.0 microgram /dl. All other variables was not statistically associated with memory impairment among male severe hypothyroid patients.

Association between level of memory impairment among male severe hypothyroid patients with their selected socio demographic and clinical variables

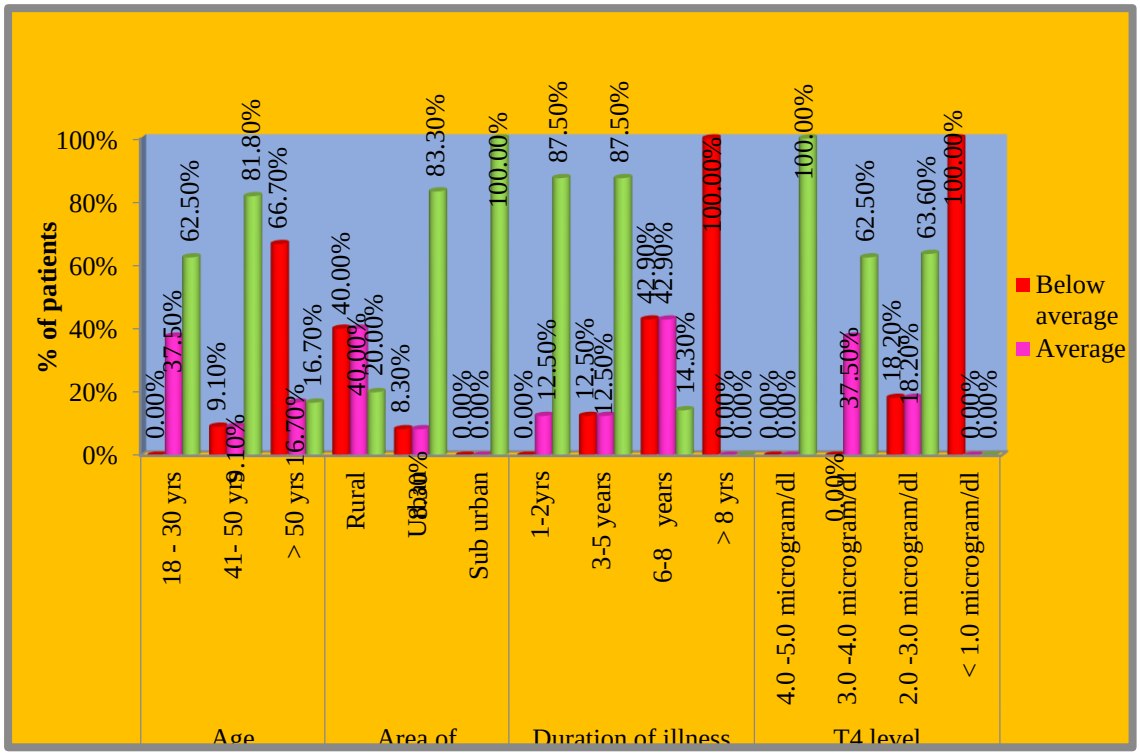


Figure 19: Multiple bar diagram shows the association between level of memory impairment among male severe hypothyroid patients with their selected socio demographic and clinical variables.

While explaining the association between the level of memory impairment score among male severe hypothyroid patients with their selected socio demographic variables. Chi-square analysis reveals that there was a statistically significant association between memory impairment and **age** ($\chi 2=10.30$) (P=0.03), **area of residence** ($\chi 2=11.38$) (P=0.02), **duration of illness** ($\chi 2=13.20$) (P=0.05) and **T_4 level** ($\chi 2=12.04$) (P=0.05) , (i e) age between 36 -45 , lived in urban area and duration of illness less than 5years with 2.0-3.0 microgram/.dl All other variables was not statistically associated with memory impairment among male severe hypothyroid patients.

Section VI

Association between the level of memory impairment with their selected socio demographic and clinical variables among female severe hypothyroid patients.

Table 12

Association between the level of memory impairment among female severe hypothyroid patients with their selected socio demographic variables.

Demographic variables		Level of memory impairment						n	χ2
		Below average		Average		Above average			
		f	%	f	%	f	%		
Age	20 -35	1	2.7%	14	37.8%	22	59.5%	37	χ2=3.34 P=0.50(NS)
	36-45 years	1	4.0%	10	40.0%	14	56.0%	25	
	>45 years	2	15.4%	5	38.5%	6	46.2%	13	
Religion	Hindu	2	3.0%	25	37.8%	39	59.1%	66	χ2=6.74 P=0.15(NS)
	Muslim	1	20.0%	2	40.0%	2	40.0%	5	
	Christian	1	25.0%	2	50.0%	1	25.0%	4	
Area of residence	Rural	1	3.1%	18	54.5%	14	42.4%	33	**χ2=11.09 P=0.02*(S)**
	Urban	2	5.1%	11	28.2%	26	66.7%	39	
	Sub urban	1	33.4%	0	0.0%	2	66.7%	3	
Education status	No formal education	3	37.5%	5	62.5%	0	0.0%	8	**χ2=21.63 P=0.001***(S)**
	Primary	1	3.2%	14	45.2%	16	51.6%	31	
	High school	0	0.0%	8	34.8%	15	65.2%	23	
	Secondary	0	0.0%	1	12.5%	7	87.5%	8	
	Graduate	0	0.0%	1	20.0%	4	80.0%	5	
Occupation status	Unemployed	2	8.0%	13	52.0%	10	40.0%	25	χ2=7.83 P=0.45(NS)
	Coolie	1	3.7%	9	33.3%	17	63.0%	27	
	Government	1	25.0%	1	25.0%	2	50.0%	4	
	Private	0	0.0%	4	26.7%	11	73.3%	15	
	Business	0	0.0%	2	50.0%	2	50.0%	4	

Family income per month	Rs.2000 – 4000	1	33.3%	0	0.0%	2	66.7%	3	
	Rs.4000 – 6000	0	0.0%	7	46.7%	8	53.3%	15	$\chi 2=6.41$
	Rs.6000 – 8000	1	4.0%	12	48.0%	12	48.0%	25	P=0.37(NS)
	> Rs.8000	2	6.3%	10	31.3%	20	62.5%	32	
Marital status	Married	4	5.7%	28	40.0%	38	54.3%	70	
	Single	0	0.0%	1	20.0%	4	80.0%	5	$\chi 2=1.05$
	Divorced	0	0.0%	0	0.0%	0	0.0%	0	P=0.98(NS)
	Separated	0	0.0%	0	0.0%	0	0.0%	0	
Food habits	Vegetarian	0	0.0%	2	33.3%	4	66.7%	6	$\chi 2=0.52$
	Non vegetarian	4	5.8%	27	39.1%	38	55.1%	69	P=0.76(NS)
Duration of illness	1-2yrs	0	0.0%	7	23.3%	23	76.7%	30	
	3-5 years	0	0.0%	8	30.8%	18	69.2%	26	**$\chi 2=24.06$**
	6-8 years	2	22.2%	7	77.8%	0	0.0%	9	**P=0.01**(S)**
	> 8 yrs	2	20.0%	7	70.0%	1	10.0%	10	

*** P < 0.05 significant **P < 0.01 highly significant S = significant NS = Not significant**

The above table 12 explains the association between the level of memory impairment score among female severe hypothyroid patients with their selected socio demographic variables. Chi-square analysis reveals that there was a statistically significant association between the level of memory impairment and **area of residence** ($\chi 2=11.09$) (P=0.02), **educational status** ($\chi 2=21.63$) (P=0.001), and **duration of illness** ($\chi 2=24.06$) (P=0.01) (ie) Primary education, lived in urban area, and duration of illness between 1-2 years. All other variables was not statistically associated with memory impairment among female severe hypothyroid patients.

Table 13: Association between the level of memory impairment among female severe hypothyroid patients with their selected clinical variables.

Clinical variables		Level of memory impairment						n	$\chi 2$
		Below average		Average		Above average			
		f	%	f	%	f	%		
TSH level	20-30 ml U/L	1	16.7%	1	16.7%	4	66.7%	6	$\chi 2$=11.11 P=0.07(NS)
	31-40 ml U/L	0	0.0%	5	38.5%	8	61.5%	13	
	41-50 ml U/L	1	3.8%	16	61.5%	9	34.6%	26	
	>50 ml U/L	2	6.7%	7	23.3%	21	70.0%	30	
T_3 level	70 ng/dl-80 ng/dl	0	0.0%	3	75.0%	1	25.0%	4	$\chi 2$=2.90 P=0.82(NS)
	60 ng/dl-69ng/dl	2	7.4%	10	37.0%	15	55.6%	27	
	50 ng/dl-59 ng/dl	2	4.8%	15	35.7%	25	59.5%	42	
	< 50 ng/dl	0	0.0%	1	50.0%	1	50.0%	2	
T_4 level	4.0 -5.0 microgram/dl	0	0.0%	1	12.5%	7	87.5%	8	**$\chi 2$=17.18 P=0.01**(S)**
	3.0 -4.0 microgram/dl	0	0.0%	7	26.7%	23	56.7%	30	
	2.0 -3.0 microgram/dl	2	8.0%	15	60.0%	8	32.0%	25	
	< 1.0 microgram/dl	2	16.7%	6	50.0%	4	33.3%	12	

*** P<0.05 significant **P<0.01 highly significant S=significant NS=not significant**

The above table 13 explains the association between the level of memory impairment among female severe hypothyroid patients with their selected clinical variables, chi – square test reveals that there was a statistical significant association between memory impairment and **T_4 level** ($\chi 2$=12.04) (P=0.05), (i.e) 3.0 - 4.0 microgram /dl. Other variables was not statistically associated with memory impairment among male severe hypothyroid patients.

Association between level of memory impairment among female severe hypothyroid patients with their selected socio demographic and clinical variables.

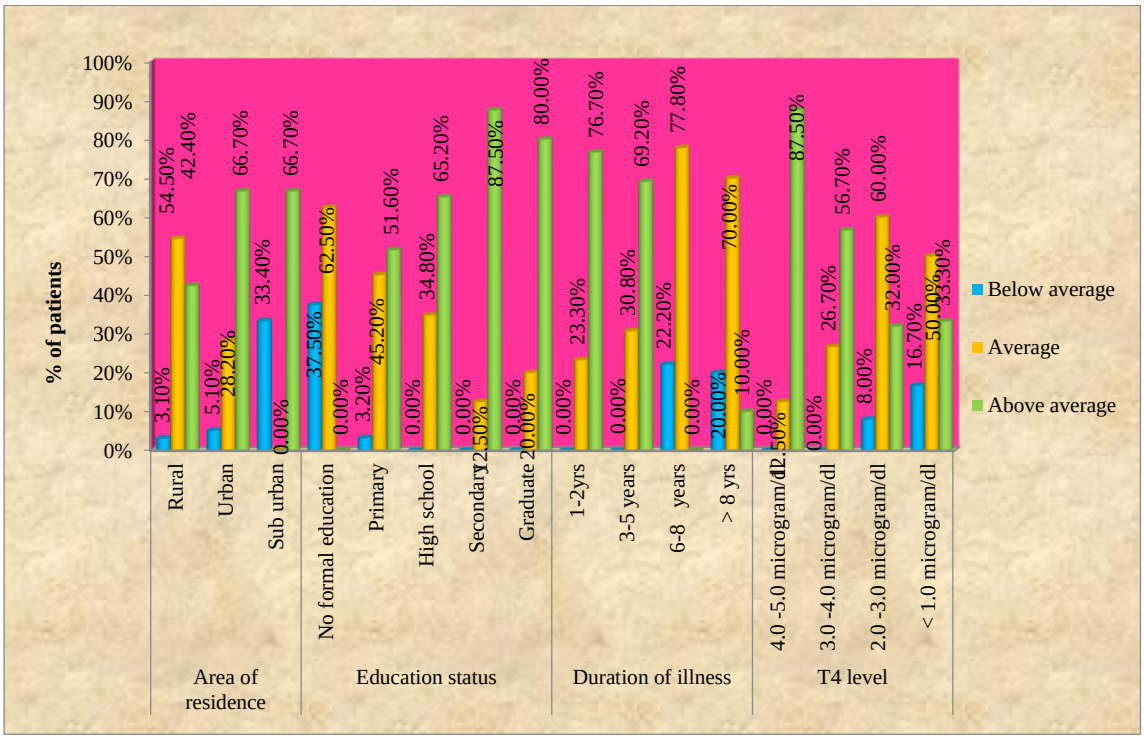


Figure 20: Multiple bar diagram shows the association between level of memory impairment among female severe hypothyroid patients with their selected socio demographic and clinical variables.

While describing the association between the level of memory impairment among female severe hypothyroid patients with their selected socio demographic variables. Chi-square analysis reveals that there was a statistically significant association between memory impairment and **area of residence** ($\chi 2=11.09$) (P=0.02), **educational status** ($\chi 2=21.63$) (P=0.001), **duration of illness** ($\chi 2=24.06$) (P=0.01) **T_4 level** ($\chi 2=17.18$) (P=0.01) (i e) primary education, lived in urban area, and duration of illness between 1-2 years T_4 level 3.0 – 4.0 microgram / dl**.** All other variables was not statistically associated with memory impairment among female severe hypothyroid patients.

DISCUSSION

CHAPTER - V

DISCUSSION

This chapter discussed about the result of the study interpreted from the statistical analysis. The purpose of the study is to assess the level of memory impairment among severe hypothyroid patients in endocrine OPD at Government Rajaji hospital, Madurai.

Memory is the faculty of the mind by which information is encoded, stored, and retrieved. Memory is vital to experiences and related to limbic systems, it is the retention of information over time for the purpose of influencing future action.[1] If we could not remember past events, we could not learn or develop language, relationships, nor personal identity. Thyroid hormones: thyroxin (T_4) and triiodothyronine (T_3). T_4 contains four iodine atoms while T_3 contains three iodine atoms. The thyroid primarily synthesizes T_4, which is then converted to T_3 in the liver. T_3 is an active hormone.

The body has a mechanism for maintaining stable thyroid hormone levels in the blood. This mechanism is controlled by thyroid-stimulating hormone (TSH) which is secreted by the pituitary gland at the base of the brain. TSH works to stimulate the thyroid and promote the secretion of thyroid hormones T_4 and T_3.Thyroid hormone is very important for memory functioning.

The objectives of the study were

1. To assess the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai.
2. To associate the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai and their selected socio demographic and clinical variables.

The following hypotheses were tested at 0.05 level of significance

H_1 - There is a significant association between the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai and their selected socio demographic and clinical variables.

The findings of the study were discussed under the following headings

- ❖ Distribution of male and female severe hypothyroid patients according to their selected socio demographic and clinical variables.
- ❖ Distribution on level of memory impairment among male severe hypothyroid patients.
- ❖ Distribution on level of memory impairment among female severe hypothyroid patients.
- ❖ Comparison between the level of memory impairment among male and female severe hypothyroid patients.
- ❖ Association between the level of memory impairment among male severe hypothyroid Patients with their selected socio demographic and clinical variables.
- ❖ Association between the level of memory impairment among female severe hypothyroid Patients with their selected socio demographic and clinical variables.

Severe hypothyroidism can affect a range of cognitive domains. Many studies report decrements in general intelligence, attention/concentration, memory, perceptual function, language, psychomotor function, and executive function. Memory is the most consistently affected domain, with specific deficits in verbal memory. L-T_4 treatment is usually effective in treating these decrements, although there may not be complete reversal.

The sample included 100 severe hypothyroid patients respectively.

5.1 Discussion based on the socio demographic and clinical variables among male and female severe hypothyroid patients.

It is interested to note that while mentioning about age group in male severe hypothyroid patients 11(44.00%) belonged to the age group between 35-45yrs, where as in female severe hypothyroid patients the majority 37(49.33%) belonged to the age group between 20-35yrs.

With regards to religion in male severe hypothyroid patients, the majority 22(88.00%) were Hindu, whereas in female severe hypothyroid patients, majority 66(88.00%) were Hindu.

According to the area of residence in male severe hypothyroid patients, majority 12(48.00%) hailed from urban area, whereas in female severe hypothyroid patients, majority 39(52.00%), hailed from urban areas.

While discussing educational status in male severe hypothyroid patients, majority 12(48.00%) had primary education, where as in female severe hypothyroid patients, majority 31(41.33%) had primary education.

With respect of occupational status in male severe hypothyroid patients, majority 9(36.00%) were Coolie, whereas female severe hypothyroid patients, majority 27(36.00%) were Coolie.

As for as family income per month in male severe hypothyroid patients, majority 12(48.00%) were earned> Rs. 8000, whereas family income pre month in female severe hypothyroid patients, majority 32(42.67%) were earned > Rs. 8000.

While considering the marital status in male severe hypothyroid patients, majority 22(88.00%) was married, whereas in female severe hypothyroid patients, majority 70(93.33%) was married.

While mentioning the food habits male severe hypothyroid patients, majority 22(88.00%) were non vegetarian, whereas in female severe hypothyroid patients, majority 69(92.00%) were non vegetarian.

While considering the duration of illness male severe hypothyroid patients, majority 8 (32.00%) undergone the treatment between 1-2yrs, 8 (32.00%) undergone the treatment between 3-5yrs, whereas in female severe hypothyroid patients, majority 30(40.00%) undergone treatment 1-2 yrs.

While comparing the TSH value of male severe hypothyroid patients, majority 15 (60.00%) were > 50 ml U/L, where as in females the majority 30 (40.00%) were lies >50 ml U/L.

While discussing the T_3 value of male severe hypothyroid patients , majority 11 (44.00%) were lies between 50 ng/dl, where as in female, majority 42 (56.99%0) were lies between 50 ng/dl.

While discussing T_4 value of male severe hypothyroid patients, majority 11 (44.00%) where comes between 2.0-3.0 microgram /dl, in females, majority30 (40.00%) where lies between 3.0-4.0 microgram /dl.

5.2 Discussion of the study based on its objectives

The first objective of the study was to assess the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai.

Post graduate institute memory assessment tool memory assessment scale was used to assess the level of memory impairment among male and female severe hypothyroid patients, in male majority 15(60.00%) of them having above average memory, none of them having low level memory and excellent memory. In female

severe hypothyroid patients, majority 42(56.00%) of them having above average memory, none of them having excellent memory or low level memory.

It was supported by **Giuseppe Pasqualetti., (2015)** conducted the meta analysis of association between subclinical hypothyroidism Subclinical hypothyroidism and Cognitive Impairment Systematic Review and Meta-Analysis ,the association between subclinical hypothyroidism and cognitive impairment The aim of this systematic review and meta-analysis was to evaluate the possible effect of Subclinical hypothyroidism on cognitive decline and the risk of dementia. Cognitive function was the primary outcome, evaluated as composite end point of incidence or prevalence of dementia or difference of Mini Mental State Examination, Wechsler Adult Intelligence Scale, and Wechsler Memory Scale-Revised scores was observed thirteen studies were included in the meta-analysis. A significant risk of cognitive alteration was observed only in subclinical hypothyroidism individuals younger than age 75 years, composite endpoint odds ratio (OR) 1.56 (95% confidence interval [CI] 1.07–2.27, *P*.02, I2 82.5%), risk of dementia OR 1.81 (95% CI 1.43–2.28, *P* = .01, I2 - 35%). Mean serum thyroid-stimulating hormone (TSH) levels and the OR of composite endpoint were positively correlated. No significant effect of sub clinical hypothyroidism was found when considering all the studies as a whole: composite endpoint OR 1.26 (95% CI 0.96–1.66, *P* = .09, I2 - 87.2%), risk of dementia OR 1.42 (95% CI, 0.97–2.07, *P* = .07, I2 - 66.8%), Mini Mental State Examination mean difference 0.059 (95% CI - 0.464 to 0.346 *P* = .78, I2 - 51.8%). This meta-analysis demonstrates a relationship between subclinical hypothyroidism and cognitive impairment only in individuals younger than 75 years of age and those with higher TSH concentrations.

The second objective of the study was to associate the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at GRH Madurai and their selected socio demographic and clinical variables

In order to find out the association between level of memory impairment among male and female severe hypothyroid patients, in male Chi-square analysis reveals that **age** ($\chi 2$=10.30) (P=0.03), **area of residence** ($\chi 2$=11.38) (P=0.02), **duration of illness** ($\chi 2$=13.20) (P=0.05) T_4 = $\chi 2$ = 12.04 P = 0.05 (ie) age between 36 -45 years, lived in urban area, duration of illness less than 5years and **T_4 level** 2.0 – 3.0 microgram/dl. All other variables was not statistically associated with memory impairment among female severe hypothyroid patients.

The association between level of memory impairment among female severe hypothyroid with their selected socio demographic and clinical variables. Chi-square analysis reveals that **area of residence** ($\chi 2$=11.09) (P=0.02), **educational status** ($\chi 2$=21.63) (P=0.001), and **duration of illness** ($\chi 2$=24.06) (P=0.01) T_4 $\chi 2$ = 17.18 P = 0.01 (i.e) those who were lived in urban area, had primary education and duration of illness between 1-2 years and T4 level 3.0 – 4.0 microgram/ dl. All other variables was not statistically associated with memory impairment among female severe hypothyroid patients.

It was also supported by **A R Somashekar., (2014)** conducted the study on correlation of Cognitive Performance and Thyroid Hormone Levels in Adolescents with Subclinical Hypothyroidism. Subclinical hypothyroidism (SCH) can negatively affect cognitive functioning. This study aimed at correlating serum T_3, T_4, TSH with adolescent's performance on a learning disability scale. A cross-sectional study was conducted on 100 school children, (10 - 15 years). Thyroid hormones were estimated and classified into two groups such as euthyroid and subclinical hypothyroid. NIMHANS index for Specific Learning Disabilities was used to assess the learning ability and cognitive functions. Subclinical hypothyroid group made more mistakes than euthyroid group. In SCH male group, T_3 correlated with language and T_4 levels

correlated in all areas except in language. In the females, there is no significant correlation between T_3 and ability parameters except in partial correlation coefficient among euthyroid children in arithmetic, visual-motor skills and memory. T_4 results did not correlate in language skills. There was a statistical significance between T_4 and ability skills in girls except in language. TSH and language skills correlated in females. Conclusion: T_3 and T_4 levels have correlation with cognitive skills other than TSH. It is necessary to measure both T_3 and T_4 in addition to TSH in adolescents.

Hence the stated hypotheses H_1 There is a significant association between the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai with their selected socio demographic and clinical variables was accepted.

SUMMARY
&
CONCLUSION

CHAPTER - VI

SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

This chapter deals with summary, conclusion and recommendations of the study. Further it includes implications for Nursing Practice, Nursing Education, Nursing Administration and Nursing Research.

6.1 Summary

The present study was done to assess the level of memory impairment among severe hypothyroid patients in endocrine outpatient department at Government Rajaji Hospital, Madurai.

The objectives of the study were

1. To assess the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at GRH Madurai-20
2. .To associate the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at GRH Madurai and their selected socio demographic variables.

The following hypotheses were tested at 0.05 level of significance.

H_1 - There is a significant association between the level of memory impairment among male and female severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai with their selected socio demographic and clinical variables.

The study assumptions were

Severe hypothyroid patients have a different level of Memory impairment.

The conceptual frame work of the study was based on Modified Shiffman's Interactive Models of Factors leading to outcomes in health. The study was conducted

by using non experimental (descriptive) research design. Samples of 100 severe hypothyroid patient in endocrine OPD at Government Rajaji hospital Madurai, were selected by non-probability consecutive sampling method. After testing the validity and reliability of the tool, a pilot study was conducted on 10 non study subjects of severe hypothyroid patients in endocrine OPD at Government Rajaji hospital, Madurai to find out the feasibility and practicability. The main study was started from 04.06.2018 to 13.07.2018. Based on the objectives and hypotheses the data gathered was analyzed by using both descriptive and inferential statistics.

The data collection tool consisted of three parts.

Part I: Socio demographic variables.

It consists of socio demographic variables of the patients. The socio demographic variables includes age, sex, religion, area of residence, education, occupation, family income per month, marital status, food habits, and duration of illness.

Part II: Clinical variable

It consist of clinical variable such as TSH, T_3, T_4 Levels.

Part III: PGI memory assessment scale

It consist of 10 components and each answer scored on a scale ranging from 0-11 which was designed to assess the memory function.

The tool was validated by experts in the field of Psychiatric Nursing, Psychiatry, and Psychology. Data collection was done by using the prescribed tool to assess the level of memory impairment among severe hypothyroid patients.

Collected data was analyzed by using both descriptive statistics (Mean, Standard Deviation, Frequency and Percentage) and inferential statistics (Paired', Independent "t" test and Chi-Square) and result were analyzed.

6.2 Major findings of the study

- According to the age group in male severe hypothyroid patients, majority 11 (44.00%) belonged to the age group between 35-45yrs, whereas in female severe hypothyroid patients the majority 37 (49.33%) belonged to the age group between 20-35yrs
- With regards to religion in male severe hypothyroid patients, the majority 22 (88.00%) were Hindu, whereas in female severe hypothyroid patients, majority 66 (88.00%) were Hindu.
- According to the area of residence in male severe hypothyroid patients, majority 12 (48.00%) hailed from urban area, whereas in female severe hypothyroid patients, majority 39 (52.00%), hailed from urban areas.
- While discussing educational status in whereas in male severe hypothyroid patients, majority 12 (48.00%) had primary education, whereas in female severe hypothyroid patients, majority 31 (41.33%) had primary education.
- With respect of occupational status in male severe hypothyroid patients, majority 9 (36.00%) were coli, whereas female severe hypothyroid patients, majority 27 (36.00%) were colie.
- As for as family income per month in male severe hypothyroid patients, majority 12 (48.00%) were earned more than Rs. 8000, whereas family income per month in female severe hypothyroid patients, majority 32 (42.67%) were earned more than Rs. 8000.
- While considering the marital status in male severe hypothyroid patients, majority 22 (88.00%) was married, whereas female severe hypothyroid patients, majority 70 (93.33%) was married.

- While mentioning the food habits male severe hypothyroid patients, majority 22 (88.00%) were non vegetarian, whereas female severe hypothyroid patients, majority 69 (92.00%) were non vegetarian.
- While considering the duration of illness male severe hypothyroid patients, majority 8 (32.00%) undergone the treatment less than 5 years, whereas female severe hypothyroid patients, majority 30 (40.00%) undergone treatment 1-2 years.

Post Graduate Institute memory assessment scale was used to assess the level of memory impairment among male and female severe hypothyroid patients.

- While discussing memory scoring of male severe hypothyroid patients, majority 15 (60.00%) of them having above average memory, whereas in female severe hypothyroid patients, majority 42 (56.00%) of them having above average memory.

Comparing the level of memory impairment between the male and female male and female severe hypothyroid patients according to the domains.

- In male the mean score of remote memory 4.92 with SD .81 where as in female the mean score was 4.24 with SD 0.68 and the mean difference 0.68 and the calculated t value 2.54 at 0.01 level.
- In male the mean score of recent memory 3.92 with SD .81 where as in female the mean score was 3.55 with SD .78 and the mean difference 0.37 and the calculated t value 2.05 at 0.05 level.
- In male the mean score of mental balance 6.28 with SD 1.24 where as in female the mean score was 6.16 with SD 2.16 and the mean difference 0.12 and the calculated t value 0.26 at 0.79 level.

- In male the mean score of attention and concentration 8.28 with SD 2.23 where as in female the mean score was 8.03 with SD 2.57 and the mean difference 0.25 and the calculated t value 1.26, at 0.73 level.
- In male the mean score of delayed recall 8.28 with SD 1.54 where as in female the mean score was7.47 with SD 1.75 and the mean difference 0.81 and the calculated t value 2.07 at 0.73 level.
- In male the mean score of immediate recall 9.04 with SD 2.15 where as in female the mean score was 8.13 with SD 2.41 and the mean difference 0.91 and the calculated t value 1.67 at 0.10 level.
- In male the mean score of visual retention of similar pairs 4.20 with SD .91 where as in female the mean score was 3.61 with SD 1.30 and the mean difference 0.59 and the calculated t value 2.08, at 0.05 level.
- In male the mean score of visual retention of dissimilar pairs 9.24 with SD 4.25 where as in female the mean score was 9.05 with SD 4.15 and the mean difference 0.19 and the calculated t value 1.01 at 0.35 level.
- In male the mean score of visual retention 7.60 with SD 2.40 where as in female the mean score was 6.20 with SD 2.82 and the mean difference 1.40 and the calculated t value 2.22 at 0.02 level.
- In male the mean score of recognition 8.24 with SD 2.03 where as in female the mean score is 7.09 with SD 2.57 and the mean difference 1.15 and the calculated t value 2.03 , at 0.05 level.

  Association between the level of memory impairment with their selected socio demographic and clinical variables.
- Association between the level of memory impairment among male severe hypothyroid patients with their selected socio demographic and clinical variables. The Chi-square analysis revealed that there was a statistically

significant association between the level of memory impairment and **age** (χ2=10.30) (P=0.03), **area of residence** (χ2=11.38) (P=0.02), d**uration of illness** (χ2=13.20) (P=0.05) T_4 level (12.04) (P – 0.05) (ie) age between 36 -45 years, lived in urban area, duration of illness less than 5years and T_4 level 2.0 – 3.0 microgram/dl. All other variables was not statistically associated with the level of memory impairment among male severe hypothyroid patients

- The association between the level of memory impairment score among female severe hypothyroid patients with their selected socio demographic variables. Chi-square analysis reveals that there was a statistically significant association between the level of memory impairment and **area of residence** (χ2=11.09) (P=0.02), **educational status** (χ2=21.63) (P=0.001), and **duration of illness** (χ2=24.06) (P=0.01) and T_4 level (χ2=12.04) (P=0.05). (i.e) lived in urban area, had primary education and duration of illness between 1-2 years with T_4 level 3.0 -4.0 microgram /dl. All other variables was not statistically associated with memory impairment among female severe hypothyroid patients.

6.3 Conclusion

The study findings evidenced that most of the severe hypothyroid patients in endocrine OPD at Govt. Rajaji Hospital, Madurai were had different level of memory impairment.

6.4 Implication of the study

The finding of the study has several implications on nursing practice, education, administration, and nursing research that can be used in the following areas of profession.

Nursing practice

- The nurse can be aware about Physical, psychological, social and environmental problem faced by the severe hypothyroid patients.
- The nurse can learn and use PGI memory assessment scale to assess the memory impairment among severe hypothyroid patients.
- Nurse identify the statistics about memory impairment among severe hypothyroid patients.
- The nurse will educate the severe hypothyroid patients about how to overcome from the memory problem by providing information booklet.

Nursing education

- The nurse educator create awareness to the students about problem faced by the severe hypothyroid patients.
- Nursing faculties can educate the nursing students to assess the level of memory impairment among severe hypothyroid patients by using PGI memory assessment scale
- Students will periodically evaluate the level of memory impairment among severe hypothyroid patients by mini mental status examination and help the patients to adhere the drug management for them life time.
- Teachers give assignment and project to the students and to make aware of them and inculcate the knowledge regarding memory impairment among severe hypothyroid patients.

Nursing research

- ❖ Based on the research study, severe hypothyroid patients can be compared with the gender differences in levels of memory impairment by using PGI memory assessment scale.

- ❖ A study can be done on quality of life among severe hypothyroid patients.
- ❖ A study can be elaborated with cognitive retraining by using the newer tool and techniques
- ❖ Nurse can also assess the psychiatric morbidity like stress and depression among severe hypothyroid patients.
- ❖ Findings of the study will provide a data about severity of memory impairment among severe hypothyroid patients in order to expand and broaden the scope of nursing.

Nursing administration

- ❖ Nurse administrators can arrange the in service education or Continuous nursing education program for nurses to create awareness about problem faced by the severe hypothyroid patients.
- ❖ Nurse administrators will motivate the nurses to gain adequate knowledge about levels of memory impairment, and encourage them to identify the levels.

6.5 Recommendations

Based on the finding of the study the recommendations offered for future research were

- A similar study can be conducted with large sample
- A true experimental study can be conducted to evaluate the effectiveness of cognitive retraining / biblio therapy on cognition and psychological wellbeing among severe hypothyroid patients attending endocrine outpatient department.

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APPENDICES

APPENDIX – I

Ethical committee approval letter

MADURAI MEDICAL COLLEGE
MADURAI, TAMILNADU, INDIA -625 020
(Affiliated to The Tamilnadu Dr.MGR Medical University, Chennai, Tamil Nadu)

Prof Dr V Nagaraajan MD MNAMS
DM (Neuro) DSc.,(Neurosciences)
DSc (Hons)
Professor Emeritus in Neurosciences,
Tamil Nadu Govt Dr MGR Medical University
Chairman, IEC

Dr.M.Shanthi, MD.,
Member Secretary,
Professor of Pharmacology,
Madurai Medical College, Madurai.

Members

1. Dr.V.Dhanalakshmi, MD,
Professor of Microbiology &
Vice Principal,
Madurai Medical College

2. Dr.Sheela Mallika rani, M.D.,
Anaesthesia , Medical
Superintendent Govt. Rajaji
Hosptial, Maudrai

3.Dr.V.T.Premkumar,MD(General Medicine) Professor & HOD of Medicine, Madurai Medical & Govt. Rajaji Hospital, College, Madurai.

4.Dr.S.R.Dhamotharan, MS.,
Professor & H.O.D i/c, Surgery,
Madurai Medical College & Govt.
Rajaji Hosptial, Madurai.

5.Dr.G.Meenakumari, MD.,
Professor of Pathology, Madurai
Medical College, Madurai

6.Mrs.Mercy Immaculate Rubalatha,
M.A., B.Ed., Social worker, Gandhi
Nagar, Madurai

7.Thiru.Pala.Ramasamy, B.A.,B.L.,
Advocate, Palam Station Road,
Sellur.

8.Thiru.P.K.M.Chelliah, B.A.,
Businessman,21, Jawahar Street,
Gandhi Nagar, Madurai.

ETHICS COMMITTEE CERTIFICATE

Name of the Candidate	:	S.Vijayapratha
Course	:	M.Sc., in Psychiatric Nursing
Period of Study	:	2016-2018
College	:	MADURAI MEDICAL COLLEGE
Research Topic	:	A study to Assess the level of memory impairment among severe hypothyroid patients in endocrine OPD at Government Rajaji Hospital, Madurai
Ethical Committee as on	:	13.04.18

The Ethics Committee, Madurai Medical College has decided to inform that your Research proposal is accepted.

Member Secretary Chairman Dean / Convenor

Prof Dr V Nagaraajan
M.D., MNAMS, D.M., Dsc.,(Neuro), Dsc (Hon)
CHAIRMAN
IEC - Madurai Medical College
Madurai

DEAN
Madurai Medical College
Madurai-20

16 MAY 2018

APPENDIX – II

Content validity certificates

CERTIFICATE FOR VALIDATION

This is to certify that the tool and content

SECTION – A : Socio demographic data

SECTION – B : CLINICAL VARIABLE

SECTION – C : PGI Memory Assessment tool

Prepared for data collection by Mrs. S. Vijayapratha II Year M.Sc (N) student , College of Nursing , Madurai Medical College, Madurai-20, who has undertaken the study field on thesis entitled **"A study to assess levels of memory impairement among hypothyroid patients in Endocrine OPD at Government Rajaji Hospital, Madurai"**has been validated by me.

K. Sathiyakala 23/5/18.

SIGNATURE OF THE EXPERT

SRI MANAKULA VINAYAGAR NURSING COLLEGE PUDUCHERRY

Name: K. SATHIYAKALA

Designation: Reader in Nursing Dept of Psychiatric Nursing Sri Manakula Vinayagar Nursing college,

Institution: Puducherry.

Date: 23/5/18.

CERTIFICATE FOR VALIDATION

This is to certify that the tool and content

SECTION – A : Socio demographic data

SECTION – B : Clinical Variable

SECTION – C : PGI Memory Assessment Scale

Prepared for data collection by Mrs.S. Vijayapratha II Year M.Sc (N) student , College of Nursing , Madurai Medical College, Madurai-20, who has undertaken the study field on thesis entitled **"A STUDY TO ASSESS THE LEVELS OF MEMORY IMPAIREMENT AMONG SEVERE HYPOTHYROID PATIENTS IN ENDOCRINE OPD AT GOVERNMENT RAJAJI HOSPITAL, MADURAI"**has been validated by me.

R. Jancy Rachel Daisy
SIGNATURE OF THE EXPERT

Name: DR. JANCY RACHEL DAISY.R

Designation: PROFESSOR CUM HOD.

Institution: C.S.I. JEYARAJ ANNAPACKIAM COLLEGE OF NURSING, PASUMALAI, MADURAI.

Date: 25.5.2018

CERTIFICATE FOR VALIDATION

This is to certify that the tool and content

SECTION – A : Socio demographic data

SECTION – B : Clinical Variable

SECTION – C : PGI Memory Assessment Scale

Prepared for data collection by Mrs.S. Vijayapratha II Year M.Sc (N) student , College of Nursing , Madurai Medical College, Madurai-20, who has undertaken the study field on thesis entitled **"A STUDY TO ASSESS THE LEVELS OF MEMORY IMPAIREMENT AMONG SEVERE HYPOTHYROID PATIENTS IN ENDOCRINE OPD AT GOVERNMENT RAJAJI HOSPITAL, MADURAI"** has been validated by me.

G. Gomathy

SIGNATURE OF THE EXPERT

Name: G. Gomathy

Designation:

PRINCIPAL
CHITHIRAI COLLEGE OF NURSING
MADURAI -9

Institution:

Date: 25.5.18

CERTIFICATE FOR VALIDATION

This is to certify that the tool and content

SECTION – A : Socio demographic data

SECTION – B : CLINICAL VARIABLE

SECTION – C : PGI Memory Assessment tool

Prepared for data collection by Mrs. S. Vijayapratha II Year M.Sc (N) student , College of Nursing , Madurai Medical College, Madurai-20, who has undertaken the study field on thesis entitled **"A study to assess levels of memory impairement among hypothyroid patients in Endocrine OPD at Government Rajaji Hospital, Madurai"**has been validated by me.

SIGNATURE OF THE EXPERT

Name: KAVITHA R-R.

Designation: Tutor,

Institution: College of Nursing, JIPMER.

Date: 23/5/18

CERTIFICATE FOR VALIDATION

This is to certify that the tool and content

SECTION – A : Socio demographic data

SECTION – B : Clinical questionnaire

SECTION – C : PGI Memory scale

Prepared for data collection by Mrs.S.Vijayapratha II Year M.Sc (N) student , College of Nursing , Madurai Medical College, Madurai-20, who has undertaken the study field on thesis entitled **"A study to assess the levels of memory impairment among hypothyroid patients in Endocrine OPD at Government Rajaji Hospital, Madurai"**has been validated by me.

SIGNATURE OF THE EXPERT

Name: J. DEEPA, M.Sc(N),
Assistant Professor
Madurai Apollo College of Nursing
Elliyarpathy Village, Madurai - 22

Designation:

Institution:

Date:

CERTIFICATE FOR VALIDATION

This is to certify that the tool and content

SECTION – A : Socio demographic data

SECTION – B : Clinical variable

SECTION – C : PGI memory assessment scale

Prepared for data collection by Mrs.S.Vijayapratha II Year M.Sc (N) student , College of Nursing , Madurai Medical College, Madurai-20, who has undertaken the study field on thesis entitled **"A study to assess the levels of memory impairment among severe hypothyroid patients in endocrine OPD at Government Rajaji Hospital, Madurai-20"**has been validated by me.

SIGNATURE OF THE EXPERT

28.7.2018

Dr. T. KUMANAN, M.D.(PSY),DPM
Reg. No. 42857
Professor of Psychiatry / Senior Civil Surgeon
Madurai Medical College / Govt. Rajaji Hospital
Madurai

Name:

Designation:

CERTIFICATE FOR VALIDATION

This is to certify that the tool and content

SECTION – A : Socio demographic data

SECTION – B : Clinical variable

SECTION – C : PGI memory assessment scale

Prepared for data collection by Mrs.S.Vijayapratha II Year M.Sc (N) student , College of Nursing , Madurai Medical College, Madurai-20, who has undertaken the study field on thesis entitled **"A study to assess the levels of memory impairment among severe hypothyroid patients in endocrine OPD at Government Rajaji Hospital, Madurai-20"**has been validated by me.

N. Suresh Kumar

SIGNATURE OF THE EXPERT

Name: N. SURESH KUMAR

N. SURESH KUMAR.
M.A., M.Phil.(Clin.Psy.
Asst. Prof. Cum Clinical Psychologist
Dept. of Psychiatry
Govt. Rajaji Hospital, Madurai-20

Designation:

Institution

APPENDIX – III

Informed consent form

NAME:

DATE:

Hence I am acknowledge that information regarding the project study topic was explained to me and the positive reason was pointed out. I am voluntarily willing to participate in the study, at any time I am free to exclude from the study and promised that my all personal information should be kept in confidential.

Signature of the Participant

ஒப்புதல் அறிக்கை

பெயர் நாள்

எனக்கு இந்த செவிலிய ஆய்வினைப் பற்றிய முழு விவரமும் தெளிவாக எடுத்துரைக்கப்பட்டது. இந்த ஆய்வில் பங்குகொள்வதில் உள்ள நன்மைகள் மற்றும் தீமைகள் பற்றி முழுமையாக புரிந்து கொண்டேன். இந்த ஆய்வில் நான் தானாக முன்வந்து பங்குபெறுகிறேன். மேலும் எனக்கு இந்த ஆய்வில் இருந்து எந்தசமயத்திலலும் விலகிக்கொள்ள முழு அனுமதி வழங்கப்பட்டுள்ளது, என்னுடைய பெயர் மற்றும் அடையாளங்கள் ரகசியமாக வைத்துக்கொள்ளப்படும் என்றும் உறுதியளிக்கப்பட்டுள்ளது.

கையொப்பம்

APPENDIX – IV

Letter seeking and granting permission to conduct the pilot study and main study at endocrine OPD, GRH, Madurai

From

S. Vijayapratha
II Year M.Sc. (N),
College of Nursing,
Madurai Medical College,
Madurai-20

To

The Professor and HOD,
Department of Endocrinology,
Government Rajaji hospital,
Madurai-20

Through, the proper channel,

Respected sir,

Sub: CON, MMC, Madurai II Year M.Sc.(N), Department of Psychiatric Nursing -Permission for conducting pilot study and main study in Endocrinology OPD, GRH, Madurai- Request regarding.

As per the curriculum recommended by the Indian Nursing Council and The Tamilnadu Dr.MGR Medical university of M.Sc.(N) candidates are required to conduct a dissertation study for the partial fulfillment of the course in their respective departments.

I wish to conduct a study topic on **"A study to assess the levels of memory impairment among hypothyroid patients in Endocrine OPD at Government Rajaji Hospital, Madurai"** for my dissertation. I would like to conduct the pilot study and main study in Endocrinology OPD, GRH, Madurai from 21st May onwards. I assure you that I will not interfere with the routine activities of the Outpatient department.

Hence, I kindly request you to consider my requisition and permit me to conduct the study in Endocrinology OPD, GRH, Madurai.

Thanking you

Place: Madurai
Date: 18/05/2018

Yours Sincerely
S. Vijayapratha
[S. Vijayapratha]

Dr. S. Rajammani 18/5/18

Forwarded S.P 18/5/18

19/5/18

APPENDIX - V

Socio demographic variables-English

Sample No:

Date: **Place:**

Age: **Sex :**

1. Age

a. 20 -35

b. 36-45 years

c. >45 years

2. Gender

a. Male

b. Female

3. Religion

a. Hindu

b. Muslim

c. Christian.

4. Area of residence

a. Rural

b. Urban

c. Sub urban

5. Education

a. No formal education

b. Primary

c .High school

d. Secondary

e. Graduate

6. Occupation

a. Unemployed

b. Coolie

c. Government

d. Private

e. Business

7. Family income per month

a. Rs.2000 - 4000

b. Rs.4000 - 6000

c. Rs.6000 – 8000

d. > Rs.8000

8. Marital status

a. Married

b. Single

c. Divorced

d. Separated

9. Food habits

a. Vegetarian

b. Non vegetarian

10. Duration of illness

a.1-2yrs

b. 3-5 years

c. 6-8 years

d.> 8 yrs

APPENDIX - VI

Clinical variables - English

Sample No:

Date: **Place:**

Age: **Sex :**

1. TSH level

a. 20-30 ml U/L

b. 31-40 ml U/L

c. 41-50 ml U/L

d. >50 ml U/L

2. T3 level

a. 70 ng/dl-80 ng/dl

b. 60 ng/dl-69ng/dl

c. 50 ng/dl-59 ng/dl

d. < 50 ng/dl

2. T4 level

a. 4.0 -5.0 microgram/dl

b. 3.0 -4.0 microgram/dl

c. 2.0 -3.0 microgram/dl

d. < 1.0 microgram/dl

APPENDIX – VII

Research tool-English

PGI memory assessment tool

I. Remote Memory

1. How old are you?

2. Where were you born?

3. When were you married?

4. When did you start earning? ——————————————————————

5. When did you left study/pass high school? ——————————————

6. How old is your youngest child/brother/sister? ——————————————

7. When did you come first time in this clinic/department (Hospital)?--

II Recent Memory

1. What did you eat in your last dinner?

2. What did you eat this morning?

3. What is the name of this month

4. What day is today?

5. Who came to visit you or to whom you visited yesterday

III. Mental Balance

1. Recite A to Z (Alphabet of any language).

2. Count backward from 20 to 1

3. Count backward by minusing 3s starting from 40.

IV. Attention and Concentration

1. I am going to say some numbers. Listen them carefully, whenI read

them, you will repeat them in the same order

5-7-3	
5-3-8-7	
1-6-4-9-5	
3-4-1-7-9-6	
7-2-5-9-4-8-3	
4-7-2-9-1-6-8-5	

4-1-7	
6-1-5-8	
2-9-7-6-3	
6-1-5-8-3-9	
4-7-1-5-3-8-6	
9-2-8-8-3-1-7-4	

2. I am going to read some numbers but you will be required to repeat them backward. For example, I say 2, 5 you will say 5, 2

8-5	
4-3-7	
8-5-6-3	
4-7-2-9-1	
2-5-9-4-8-3	
3-5-8-6-1-9-2	
8-5-2-3-6-1-9-4	

2-8	
8-5-1	
3-7-5-9	
9-2-5-8-4	
7-1-5-3-9-6	
6-3-7-1-4-8-5	
2-8-4-5-9-7-1-3	

V. Delayed Recall

I am going to read the Name of some objects listen carefully and when I asked you to repeat you will do so.

Umbrella

Flower

Clock

Picture

Pencil

Fish

Lamp

Rupee

Taj

Toy

VI. Immediate Recall

I am going to read a few small sentences one by one. Listen them carefully when I am through I would like you to tell me a whole sentence as precisely as you can.

1. Ram got up from the chair open the door and went to market
2. Patient was asked to lie down on the table, he was seen medicine was prescribed and was told to come next day.
3. Mohan did not have water in his house. He picked up the bucket went to street filled it up and return back

VII. Verbal retention

I am going to read to you a list of pairs Example two words at a time, listen carefully when I name one word of the pair you will tell the second word of the pair

1. Tree Flower
2. Sweet Sour
3. Man Women
4. Day Night
5. Black White

VIII. Verbal Retention for Dissimilar Pairs

Table – black

Tree-high

Lamp-un even

Child-bitter

Dream-deep

IX. Visual Retention

I am going to show you a card, see it carefully. After some time (15 seconds) I will take it away and when I ask you to memory on this paper draw (after 30 seconds) them, draw the things you saw in the card from your give a paper, a pencil and an erasure to the subject but do not instruct whether he can use the erasure or not).

X. Recognition

l am showing you a card containing pictures of many objects, see the whole card attentively (expose for 30 seconds). After some time (120 seconds inter a I will place before you another card. From this you will be required to identity and name the objects you saw in earlier card (Do not tell the subject the exact number of objects seen in first card and how many things he is yet to identify). Write the names given by the subject in the space given below

Scoring Criteria for Various Items of Recognition Sub-test X

Give a score of one for correct identification and correct naming of an item Give half score for correct identification but wrong naming of an item.

Few subjects sometimes use different names for a particular item. Correct names for each item of this sub-test are given below. Any name other than those given here and only the description of the item, should be regarded as incorrect However, if the exa that the response given by the subject is not markedly wrong. he-may give credit for that feels.

APPENDIX – VIII

Socio demographic variables-Tamil

பிரிவு - அ

சமூக குடியியல் விவரங்கள்

1) வயது

அ) 20 - 35

ஆ) 36- 45

இ) 45 க்கு மேல்

2) பாலினம்

அ) ஆண்

ஆ) பெண்

3) மதம்

அ) இந்து

ஆ) கிறித்தவர்

இ) முஸ்லிம்

4) வசிப்பிடம்

அ) நகரம்

ஆ) கிராமம்

இ) புறநகரம்

5) கல்வி தகுதி

அ) படிக்காதவடர்

ஆ) ஆரம்பக் கல்வி

இ) உயர்நிலைக் கல்வி

ஈ) மேல் நிலைக் கல்வி

உ) பட்டதாரி

6) தொழில் தகுதி

அ) குடும்ப நிர்வாகி

ஆ) கூலித்தொழில்

இ) அரசு பணி

ஈ) தனியார் பணி

உ) சுயதொழில்

7) குடும்ப மாத வருமானம்

அ) ரூ 2000-4000

ஆ) ரூ 4000-6000

இ) ரூ 6000-8000

ஈ) ரூ >8000 க்கு மேல்

8) திருமணத் தகுதி

அ) திருமணமானவர்

ஆ) திருமணமாகாதவர்

இ) விவாகரத்து ஆனவர்

ஈ) துணையை பிரிந்து இருப்பவர்

9) உணவுப்பழக்கம்

அ) சைவம்

ஆ) அசைவம்

10) நோயின் ஆண்டுகள்

அ) 1-2 வருடங்கள்

ஆ) 3-5 வருடங்கள்

இ) 6-8 வருடங்கள்

ஈ) 8 வருடங்களுக்கு மேல்

APPENDIX - IX

Clinical variable - Tamil

1. தைராக்சினை தூண்டும் ஹார்மோனின் அளவு

1.20-30மிலி. யூ/லி

2.31-40மிலி. யூ/லி

3.41-50மிலி. யூ/லி

4.>50 மிலி. யூ/லி

2. டிரைஅயோடோ தைரோனின் அளவு

1.70-80 நா.கி/டெ.லி

2. 62-69 நா.கி/டெ.லி

3.50-59 நா.கி/டெ.லி

4. < 50 நா.கி/டெ.லி

3. தைராக்சின் அளவு

1.4.0 -5.0 மை.கி/ டெ.லி

1.3.0 -4.0 மை.கி/ டெ.லி

3.2.0 -3.0 மை.கி/ டெ.லி

4. < 1.0 மை.கி/ டெ.லி

APPENDIX – X

Research tool - Tamil

பி ஜி ஐ நினைவுத்திறன் பரசோதனை கேள்வித்தாள்

1. நீளிடை நினைவுத்திறன்

1. உங்களின் வயது என்ன?
2. நீங்கள் எங்கு பிறந்தீர்கள்?
3. உங்களுக்கு எப்பொழுது திருமணம் ஆனது?
4. நீங்கள் எப்பொழுது சம்பாத்தியம் பண்ன ஆரம்பித்தீர்கள்?
5. நீங்கள் எப்பொழுது படிப்பை நிறுத்தினீர்கள் (அ) 10ம் வகுப்பு தேர்ச்சி பெற்றீர்கள்?
6. உங்களின் கடைசி குழந்தை, (அ) தம்பி (அ) சகோதரியின் வயது என்ன?

2. அண்மை நினைவுத்திறன்

1. நீங்கள் இதற்கு முந்தைய இரவு என்ன உணவு சாப்பிட்டீர்கள்?
2. இன்று காலை என்ன உணவு சாப்பிட்டீர்கள்?
3. இந்த மாதத்தின் பெயர் என்ன?
4. இன்று எனன கிழமை?
5. நேற்று உங்களை யாயராவது சந்தித்தார்களா அல்லது நீங்கள் யாரையாவது சந்தித்தீர்களா?

3. மனதால் இயக்கப்படுகிற நினைவுத்திறன்

1. A முதல் Z சொல்லுங்கள்
2. 20 முதல் 1 வரை பின்நோக்கி சொல்லுங்கள்
3. 100 லிருனந்து பின்நோக்கி மூன்று மூன்றாக கழித்து சொல்லுங்கள்

4. கவனம் மற்றும் ஒருமுகப்படுத்துதல்

1. நான் சில எண் வரியை சொல்லுவேன் அதை கூர்ந்து கவனித்து அதை அப்படியே வரிசைப்படி சொல்லவேண்டும்

5-7-3	
5-3-8-7	
1-6-4-9-5	
3-4-1-7-9-6	
7-2-5-9-4-8-3	
4-7-2-9-1-6-8-5	

4-1-7	
6-1-5-8	
2-9-7-6-3	
6-1-5-8-3-9	
4-7-1-5-3-8-6	
9-2-8-8-3-1-7-4	

2. நான் சில எண் வரியை சொல்லுவேன் ஆனால் நீங்கள் அதை பின்நோக்கி சொல்ல வேண்டும். (உ .ம்) நான் 2, 5 என்று சொன்னால் நீங்கள் 5, 2 என்று சொல்ல வேண்டும்.

3-8-5	
4-3-7	
8-5-6-3	
4-7-2-9-1	
2-5-9-4-8-3	
3-5-8-6-1-9-2	
8-5-2-3-6-1-9-4	

2-8	
8-5-1	
3-7-5-9	
9-2-5-8-4	
7-1-5-3-9-6	
6-3-7-1-4-8-5	
2-8-4-5-9-7-1-3	

5. காலதாமத நினைவுத்திறன்

நான் சில பொருட்களின் பெயர்களை சொல்லுவேன், அதை கவனித்து நான் கேட்கும்பொழுது திரும்ப சொல்லவேண்டும்.

குடை	மீன்
பூ	விளக்கு
கடிகாரம்	காசு
படம்	தாஜ்
பென்சில்	பொம்மை

6. உடனடி நினைவுத்திறன்

நான் சில வரிகளை ஒன்றன் பின் ஒன்றாக சொல்லுவேன் அதை கவனித்து நான் சொல்லும்பொழுது முழுவரியையும் உங்களால் முடிந்தவரை சொல்லவேண்டும்

1. ராம் நாற்காலியிலிருந்து எழுந்து, கதவை திறந்து சந்தைக்கு சென்றான்.
2. நோயாளி மேசையின் படுக்கபவைக்கப்பட்டு அவர் கவனிக்கப்பட்டு, மருந்து பரிந்துரைக்கப்பட்டு அடுத்த நாள் வரும்படி கூறப்பட்டது.
3. மோகனுடய வீட்டில் தண்ணீர் இல்லை, அவன் வாளியை எடுத்துக்கொண்டு கிணற்றிற்கு சென்று வாளியை நிரப்பிக்கொண்டு திரும்பிவந்தான்

7. ஓரின சொல் சார்ந்த நினைவுத்திறன்

நான் இப்பொழுது சில ஜோடி வார்த்தைகளை சொல்லுவேன், அதாவது இரண்டு வார்த்தைகளை ஒரநேரத்தில் சொல்லுவேன், நீங்கள் அதை கவனிக்கவேண்டும். பின்பு அந்த ஜோடியில் ஒரு வார்த்தையை நான் சொல்லுவேன் மற்றொன்றை நீங்கள் சொல்லவேண்டும்.

1. மரம் பூ
2. இனிப்பு புளிப்பு
3. ஆண் பெண்

4. பகல் இரவு
5. கருப்பு வெள்ளை

8. வேறுபட்ட சொல் சார்ந்த நினைவுத்திறன்

நான் இப்பொழுது சில மாறுபட்ட வார்த்தைகளை சொல்லுவேன், அதை கவனிக்கவேண்டும். பின்பு அந்த ஜோடியில் ஒரு வார்த்தையை நான் சொல்லுவேன் மற்றொன்றை நீங்கள் சொல்லவேண்டும்.

மேசை	கருப்பு	4	2	1			
மரம்	உயர்	2	1	5			
விளக்கு	சீரற்ற	1	5	3			
குழந்தை	கசப்பு	3	4	2			
கனவு	ஆழம்	5	3	4			

9. காட்சி சார்ந்த நினைவுத்திறன்

நான் ஒரு அட்டையை உங்களிடம் காண்பிப்பேன் அதை பார்க்கவேண்டும். சிறிதுநேரம் கழித்து அதை எடுத்து விடுவேன், பிறகு சிறிதுநேரம் கழித்து அதை வரையசொல்லுவேன். நீங்கள் அட்டையில் என்ன பார்த்தீர்களோ அதை உங்களால் முடிந்த வரை இந்த காகிதத்தில் வரையவேண்டும்.

10. அங்கீகரித்தல்

நான், நிறைய பொருட்களின் படகங்கள் அடங்கிய அட்டையை உங்களிடம் காண்பிப்பேன், அட்டை முழுவதையும் கூர்ந்து பார்க்டகவேண்டும். பின் சிறிதுநேரம் கழித்து உங்கள் முன் மற்றொரு அட்டையை வைப்பேன். முந்தைய அட்டையில் என்ன பார்த்தீர்களோ அதை அடையாளம் கண்டு அந்த பொருட்களின் பெயரை இதில் எழுதவேண்டும்.

APPENDIX - XI

English editing certificate

TO WHOM SO EVER IT MAY CONCERN

This is to certify that the dissertation "**A STUDY TO ASSESS THE LEVELS OF MEMORY IMPAIRMENT AMONG SEVERE HYPOTHYROID PATIENTS IN ENDOCRINE OPD AT GOVERNMENT RAJAJI HOSPITAL MADURAI-20.** done by **Mrs.S.Vijayapratha** , M.Sc Nursing II year student, college of nursing, Madurai medical college,Madurai-20 has been edited for English language appropriateness.

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Designation: Assistant Professor

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Pasumalai
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APPENDIX - XII

Tamil editing certificate

TO WHOM SO EVER IT MAY CONCERN

This is to certify that the dissertation "**A STUDY TO ASSESS THE LEVEL OF MEMORY IMPAIRMENT AMONG SEVERE HYPOTHYROID PATIENTS IN ENDOCRINE OPD AT GOVERNMENT RAJAJI HOSPITAL,MADURAI"** done by Mrs.S.Vijayapratha, M.Sc Nursing II year student, college of nursing, Madurai medical college,Madurai-20 has been edited for Tamil language appropriateness.

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APPENDIX - XIII

Photographs


THAM CONSTRUCTION